USER GUIDE

ROVER

Rapid Observation of Vulnerability and Estimation of Risk

Northridge Earthquake, CA, January 17, 1994
Photo by Andrea Booher/FEMA News Photo

Prepared by:

ROVER Development Partners Foundation

For:

The Federal Emergency Management Agency

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1 About this Guide

"ROVER" stands for Rapid Observation of Vulnerability and Estimation of Risk. It is mobile software for building owners, building department officials, and others to perform rapid pre- and post-earthquake safety evaluation of buildings. This User Guide, prepared by the Applied Technology Council (ATC), SPA Risk LLC, and Instrumental Software Technologies, Inc. (ISTI), contains instructions for installing and using ROVER. The evaluation procedures are based on ATC-20, *Procedures for Postearthquake Safety Evaluation of Buildings,* published by ATC in 1989 and revised in 1996, and *FEMA 154: Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook,* published by ATC in 1988 and revised in 2002. FEMA 154 is available online and in paper format from the Federal Emergency Management Agency (FEMA), www.fema.gov. ATC-20 is available in paper format from ATC, www.atcouncil.org.

This is important: Before using ROVER, users should be trained on FEMA 154 and ATC-20, as they do the assessment of life-safety risk. This guide shows how to use the ROVER software to record FEMA 154 and ATC-20 observations in the field and how the administrator can use ROVER to direct field and compile the data. It is not intended to explain, for example, the differences between structure types or when to red-tag a building.

The ROVER software suite has been developed for use with Windows Mobile 5 or above smartphones with a touchscreen. It enables engineers to document inspection results using electronic input screens on the smartphone that duplicate FEMA 154 and ATC-20 rapid and detailed evaluation forms. This information is then uploaded via wireless technology, the internet, or via wired connection to a master server on which data can be reviewed, summarized, and managed by the user and by building departments in jurisdictions affected by the earthquake.

The ROVER Development Partners Foundation is a nonprofit corporation formed by ATC, SPA Risk LLC, and Instrumental Software Technologies, Inc. ROVER was developed with funding from FEMA. The following people participated in developing the ROVER software and this manual: Ron Bakerian, Doug Bausch, Bill Bell, Cathleen Carlisle, Curt Davis, Greg Deierlein, Sid Hellman, Winston Heng, Bill Holmes, Scott Hunter, Lina Kohandoust, Kuo-Wan Lin, Jeffrey Lusk, Stuart Moffatt, Ugo Morelli, Neville Pereira, Keith Porter, Larry Reaveley, Cyril Ryan, Charles Scawthorn, Hal Schechner, David Wald, Yumei Wang, and Barry Welliver.

1.1 Who Should Use This Guide

This guide is intended for users who have been trained in procedures to conduct pre- and post-earthquake safety evaluations of buildings (FEMA 154 for pre-earthquake, ATC-20 for post-

earthquake). The ROVER software suite provides a method to gather, compile, and manage FEMA 154 and ATC-20 field observations onto a Windows Mobile 5 or above smartphone.

ROVER users can expect to learn:

- The use of the software on a smartphone
- Bidirectional synchronization of data to a server
- Review, modification and transfer of new and existing data from a smartphone to a server

This guide assumes that the user has prior knowledge of the Windows operating system and use of PDA-type cell phones. For more information on the procedures and methodologies that this software is based on, please refer to the FEMA 154 Handbook and FEMA 155 Supporting Documentation, as well as the ATC-20-1 Field Manual: Postearthquake Safety and Evaluation of Buildings. More information can be obtained through FEMA at www.fema.gov or through ATC at www.atcouncil.org.

2 System Requirements

2.1 Hardware Requirements

2.1.1 Client (Smartphone)

- Windows Mobile 5 or above smartphone with the following features:
  - Touchscreen
  - Keyboard, either hard with actual keys (can be slide-out), or soft keyboard
  - Bluetooth radio
  - The phone need *not* have cellular telephone or data service, although that can help for receiving assignments and sending data
  - The phone need *not* have a Wi-Fi radio, although that can help in the same way

2.1.2 Server (Desktop)

- Windows XP, Windows Vista, Windows 7, Linux, or Macintosh operating system
- Web browser (Internet Explorer 6 or later, Safari 3 or later)
- 100MB disk space (more as the number of sites grows)
- Linux users only: Python2.5 with PIL (with support for opentype) and exiftool. (These components are installed automatically on the Windows and Macintosh versions.)
- 100MHz processor or faster
- Wi-Fi and Bluetooth enabled (not required, but helpful for wireless data sync)
- USB connectivity
- Minimum 800x600 display, 256 colors; High and True Color supported
- Printer support

2.1.3 GPS Tracking Device with Bluetooth (Optional)

- Wireless Bluetooth GPS receiver with rechargeable battery

2.2 Synchronization Software Requirements

2.2.1 Client (Smartphone)

Download the smartphone software **ROVER-Client-Installation-Software.cab** from www.roverfound.com

2.2.2 Server (Desktop)

Download the desktop ROVER server software: **ROVER-Server-Installation-Software.exe** from www.roverfound.com

3 System Description

3.1 Purpose

This document defines how the ROVER system works. ROVER operates on a client/server basis. Is has two parts both entirely under the control of the user:

- ***The client.*** This is a program operating on a Windows Mobile smartphone that is used to collect field data. One uses the client to fill out FEMA 154 or ATC-20 inspection forms.

Figure 1. An example of a Windows Mobile smartphone with slide-out keyboard

Figure 2. Other models of smartphones

- ***The server.*** A database and interface to it operating on an ordinary Windows, Macintosh or Linux desktop or laptop computer.

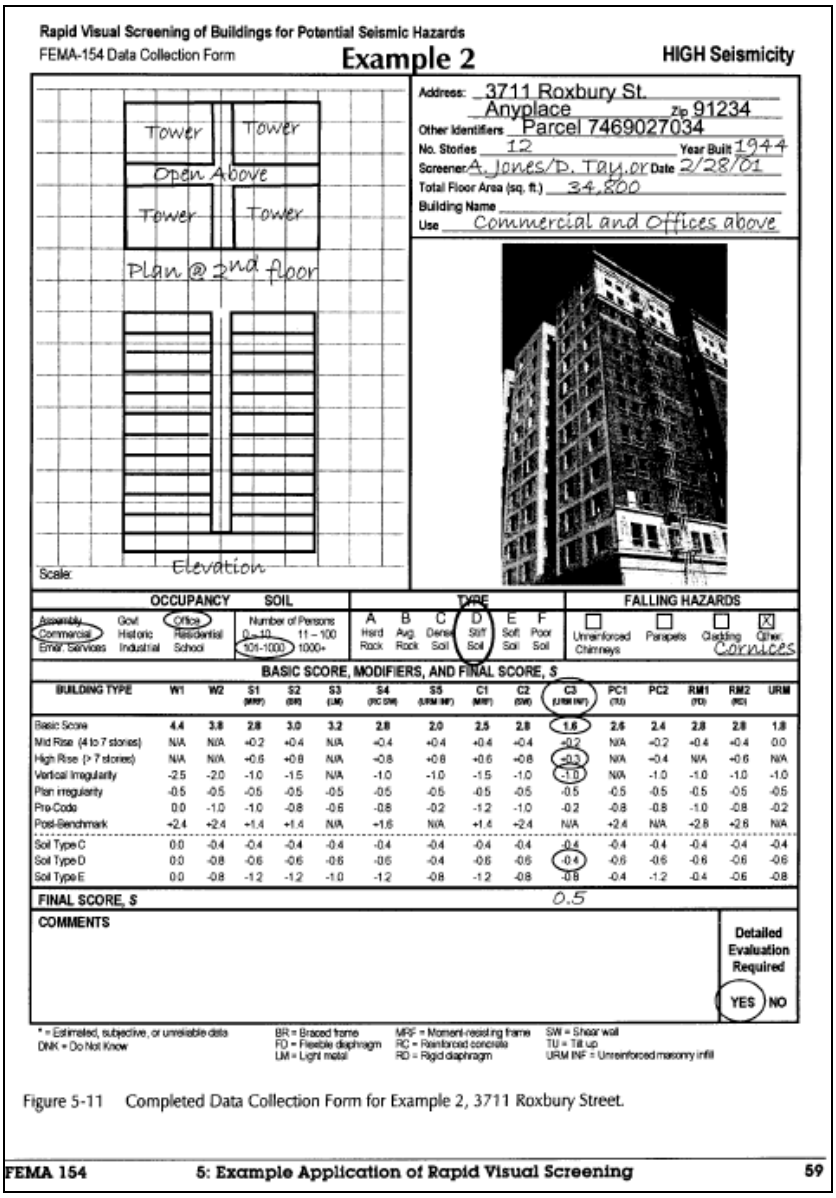
OR

Figure 3. The server operates on a Windows, Macintosh or Linux desktop or laptop computer

3.2 Benefits

To enhance the efficiency and power of the FEMA 154 and ATC-20 methodologies, ROVER automates them to handle much of the data automatically, integrating pre- and post-earthquake data with HAZUS®MH and *ShakeCast*. Specific benefits include:

- ***Print-ready forms that emulate original paper worksheets.*** Designed to enhance rather than to replace FEMA 154 and ATC-20, the data-entry forms and printable reports are arranged with the same information and the same layout as the original paper forms so that existing training works just as well for ROVER-based field observations as paper-based one. (On the smartphone, the single sheet of the data collection form is arranged in tabbed panes.)



Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA-154 Data Collection Form

Example 2

HIGH Seismicity

Address: 3711 Roxbury St. Anyplace Zip 91234
Other Identifiers Parcel 7469027034
No. Stories 12 Year Built 1944
Screener: A. Jones/D. Tay.or Date 2/28/01
Total Floor Area (sq. ft.) 34,800
Building Name
Use Commercial and Offices above

Tower Tower Open Above Tower Tower
Plan @ 2nd floor
Scale: Elevation

OCCUPANCY: Assembly, Commercial, Emer Services, Govt, Historic, Industrial, Office, Residential, School
SOIL: Number of Persons 0–10, 11–100, 101–1000, 1000+
TYPE: A Hard Rock, B Avg. Rock, C Dense Soil, D Stiff Soil, E Soft Soil, F Poor Soil
FALLING HAZARDS: Unreinforced Chimneys, Parapets, Cladding, Other: Cornices

BASIC SCORE, MODIFIERS, AND FINAL SCORE, S

BUILDING TYPE	W1	W2	S1 (MRF)	S2 (SW)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM
Basic Score	4.4	3.8	2.8	3.0	3.2	2.8	2.0	2.5	2.8	1.6	2.6	2.4	2.8	2.8	1.8
Mid Rise (4 to 7 stories)	N/A	N/A	+0.2	+0.4	N/A	+0.4	+0.4	+0.4	+0.4	+0.2	N/A	+0.2	+0.4	+0.4	0.0
High Rise (> 7 stories)	N/A	N/A	+0.6	+0.8	N/A	+0.8	+0.8	+0.6	+0.8	+0.3	N/A	+0.4	N/A	+0.6	N/A
Vertical Irregularity	-2.5	-2.0	-1.0	-1.5	N/A	-1.0	-1.0	-1.5	-1.0	-1.0	N/A	-1.0	-1.0	-1.0	-1.0
Plan Irregularity	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Pre-Code	0.0	-1.0	-1.0	-0.8	-0.6	-0.8	-0.2	-1.2	-1.0	-0.2	-0.8	-0.8	-1.0	-0.8	-0.2
Post-Benchmark	+2.4	+2.4	+1.4	+1.4	N/A	+1.6	N/A	+1.4	+2.4	N/A	+2.4	N/A	+2.8	+2.8	N/A
Soil Type C	0.0	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
Soil Type D	0.0	-0.8	-0.6	-0.6	-0.6	-0.6	-0.4	-0.6	-0.6	-0.4	-0.6	-0.6	-0.6	-0.6	-0.6
Soil Type E	0.0	-0.8	-1.2	-1.2	-1.0	-1.2	-0.8	-1.2	-0.8	-0.8	-0.4	-1.2	-0.4	-0.6	-0.8

FINAL SCORE, S: 0.5

COMMENTS

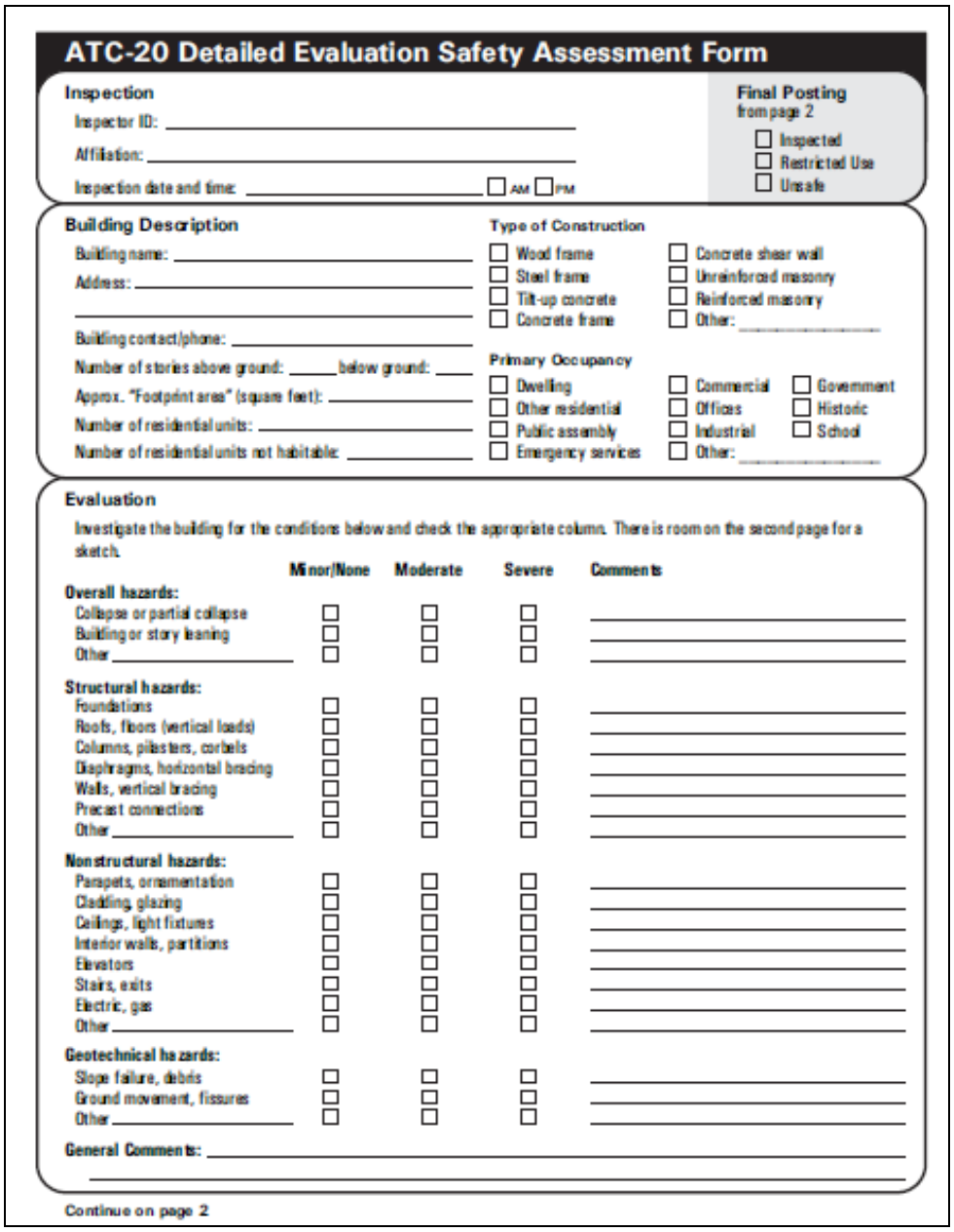
Detailed Evaluation Required: YES NO

* = Estimated, subjective, or unreliable data
DNK = Do Not Know
BR = Braced frame
FD = Flexible diaphragm
LM = Light metal
MRF = Moment-resisting frame
RC = Reinforced concrete
RD = Rigid diaphragm
SW = Shear wall
TU = Tilt up
URM INF = Unreinforced masonry infill

Figure 5-11 Completed Data Collection Form for Example 2, 3711 Roxbury Street.

FEMA 154 5: Example Application of Rapid Visual Screening 59

Figure 4. FEMA 154 paper-based pre-earthquake rapid visual screening worksheet



ATC-20 Detailed Evaluation Safety Assessment Form

Inspection

Inspector ID: _____

Affiliation: _____

Inspection date and time: _____ ☐ AM ☐ PM

Final Posting
from page 2

☐ Inspected
☐ Restricted Use
☐ Unsafe

Building Description

Building name: _____

Address: _____

_____

Building contact/phone: _____

Number of stories above ground: _____ below ground: _____

Approx. "Footprint area" (square feet): _____

Number of residential units: _____

Number of residential units not habitable: _____

Type of Construction

☐ Wood frame
☐ Steel frame
☐ Tilt-up concrete
☐ Concrete frame
☐ Concrete shear wall
☐ Unreinforced masonry
☐ Reinforced masonry
☐ Other: _____

Primary Occupancy

☐ Dwelling
☐ Other residential
☐ Public assembly
☐ Emergency services
☐ Commercial
☐ Offices
☐ Industrial
☐ Other: _____
☐ Government
☐ Historic
☐ School

Evaluation

Investigate the building for the conditions below and check the appropriate column. There is room on the second page for a sketch.

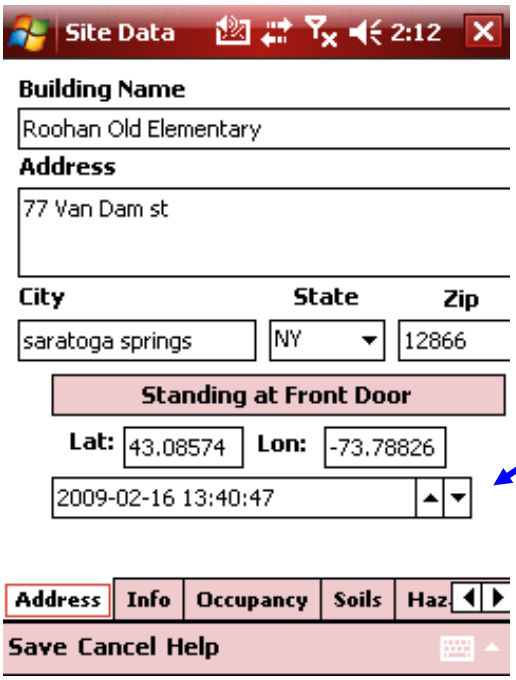
	Minor/None	Moderate	Severe	Comments
Overall hazards:				
Collapse or partial collapse	☐	☐	☐	
Building or story leaning	☐	☐	☐	
Other _____	☐	☐	☐	
Structural hazards:				
Foundations	☐	☐	☐	
Roofs, floors (vertical loads)	☐	☐	☐	
Columns, pilasters, corbels	☐	☐	☐	
Diaphragms, horizontal bracing	☐	☐	☐	
Walls, vertical bracing	☐	☐	☐	
Precast connections	☐	☐	☐	
Other _____	☐	☐	☐	
Nonstructural hazards:				
Parapets, ornamentation	☐	☐	☐	
Cladding, glazing	☐	☐	☐	
Ceilings, light fixtures	☐	☐	☐	
Interior walls, partitions	☐	☐	☐	
Elevators	☐	☐	☐	
Stairs, exits	☐	☐	☐	
Electric, gas	☐	☐	☐	
Other _____	☐	☐	☐	
Geotechnical hazards:				
Slope failure, debris	☐	☐	☐	
Ground movement, fissures	☐	☐	☐	
Other _____	☐	☐	☐	

General Comments: _____

Continue on page 2

Figure 5. ATC-20 paper-based post-earthquake safety evaluation worksheet

- ***Geolocation.*** Buildings are automatically geolocated via either ordinary GPS or wireless Bluetooth GPS. Having the latitude and longitude of inspected buildings available in a database can greatly enhance the value of the FEMA 154 and ATC-20 inspections, because survey coordinators, government decision-makers, the news media and the public find maps of inspected or damaged buildings valuable.



Sample ROVER screen with Building **Address** information and Latitude/ Longitude coordinates

- ***Integral database.*** The paper versions of FEMA 154 and ATC-20 do not include an electronic database; such a database must be built by the user. This tends to be an ad-hoc process which requires manual transcription of paper records and often produces transcription errors and results in the loss of photo and sketch data. ROVER provides a built-in database with its server and integrates the digital photos and sketches in the database.

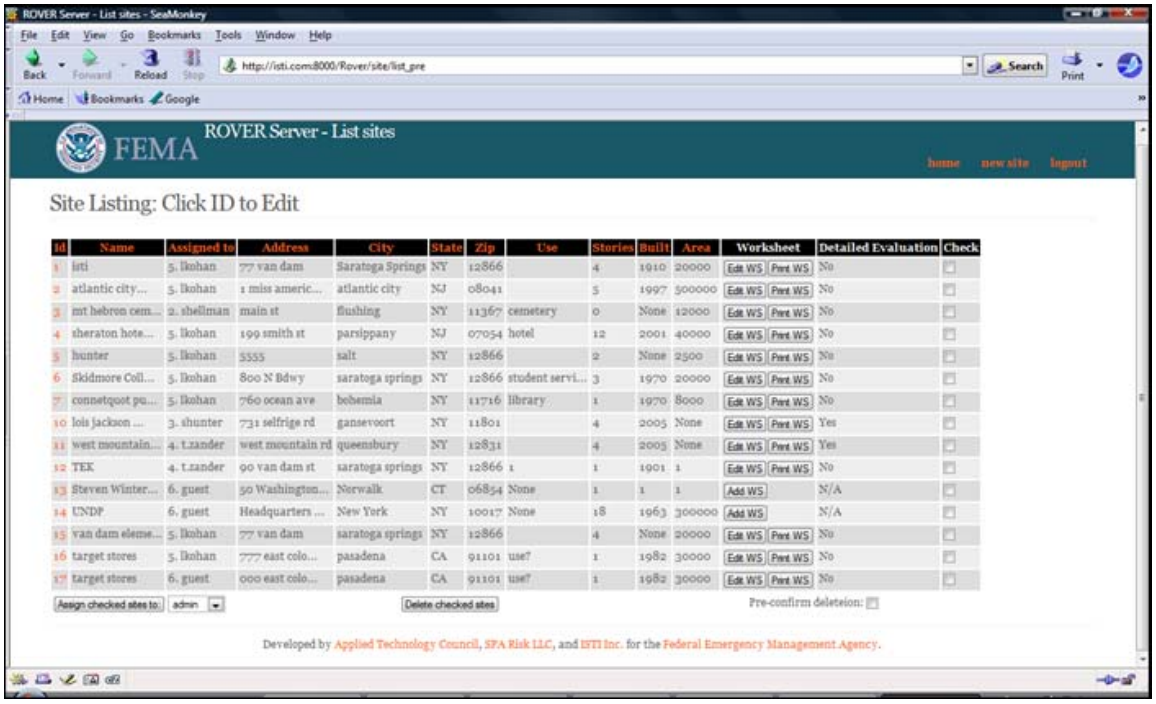
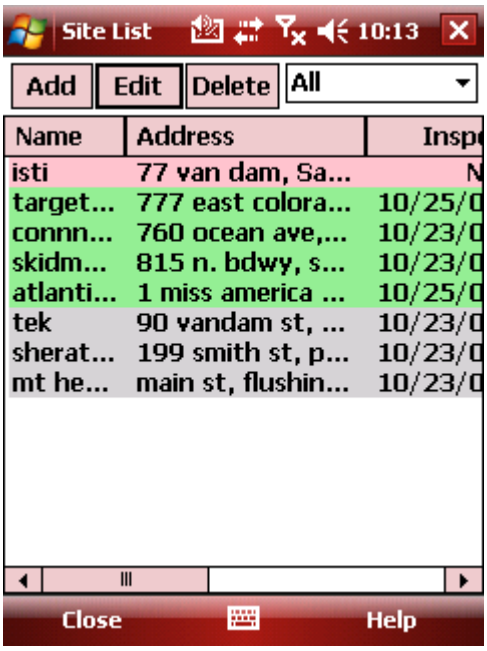
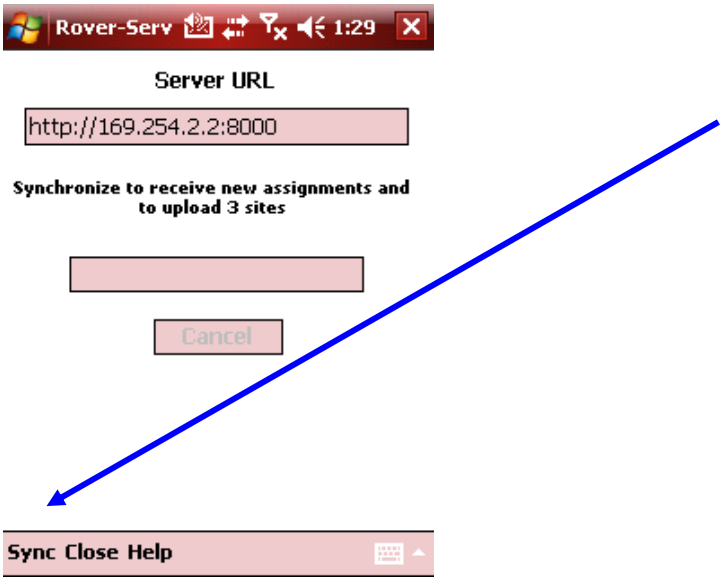


Figure 6. Sample ROVER Database displayed on a server



Sample ROVER Database displayed on the client (smartphone). Sites are color coded for ease of identification (grey for synchronized site, green for modified-but-not synchronized site, and pink for assigned, but not yet inspected site).

- ***At-will database synchronization.*** The data from the clients can be transferred to the server either by connecting clients to the server with a standard USB cable or by a secure wireless link over the Internet or the user's Intranet. Wireless synchronization can also be performed by telephone data plan. (It is *not* necessary to have a phone plan to use ROVER; the smartphone is used as a palmtop computer. A phone plan simply provides one more way to synchronize the data.)



Sample ROVER synchronization screen - Tapping on **Sync** provides bi-directional synchronization of data from the smartphone (client) to the desktop (server) and vice versa.

- ***Remote database access.*** If the user desires, the server can be securely viewed by authorized individuals via an ordinary Web browser over the Internet. One benefit of this capa-

bility is that safety evaluations can be examined at will by a structural engineering expert sitting at his or her desk, potentially thousands of miles from the inspector in real time. The ability to have experts resolve uncertainties of the inspector while the inspector is still in the field, without requiring the expert to travel, makes both the inspection process and mutual aid efforts more efficient.

- ***Merged FEMA 154 and ATC-20 data.*** Many of the FEMA 154 data items are also required for ATC-20, such as building name, location, use, structure type, etc. Pre-earthquake FEMA 154 data is available through the server's database to the post-earthquake (ATC-20) safety inspector which reduces the post-earthquake data-entry demands on the user and eliminates the effort of connecting and reconciling pre- and post-earthquake data. This makes the ATC-20 process more efficient and can help to improve the accuracy of future pre-earthquake safety evaluations.

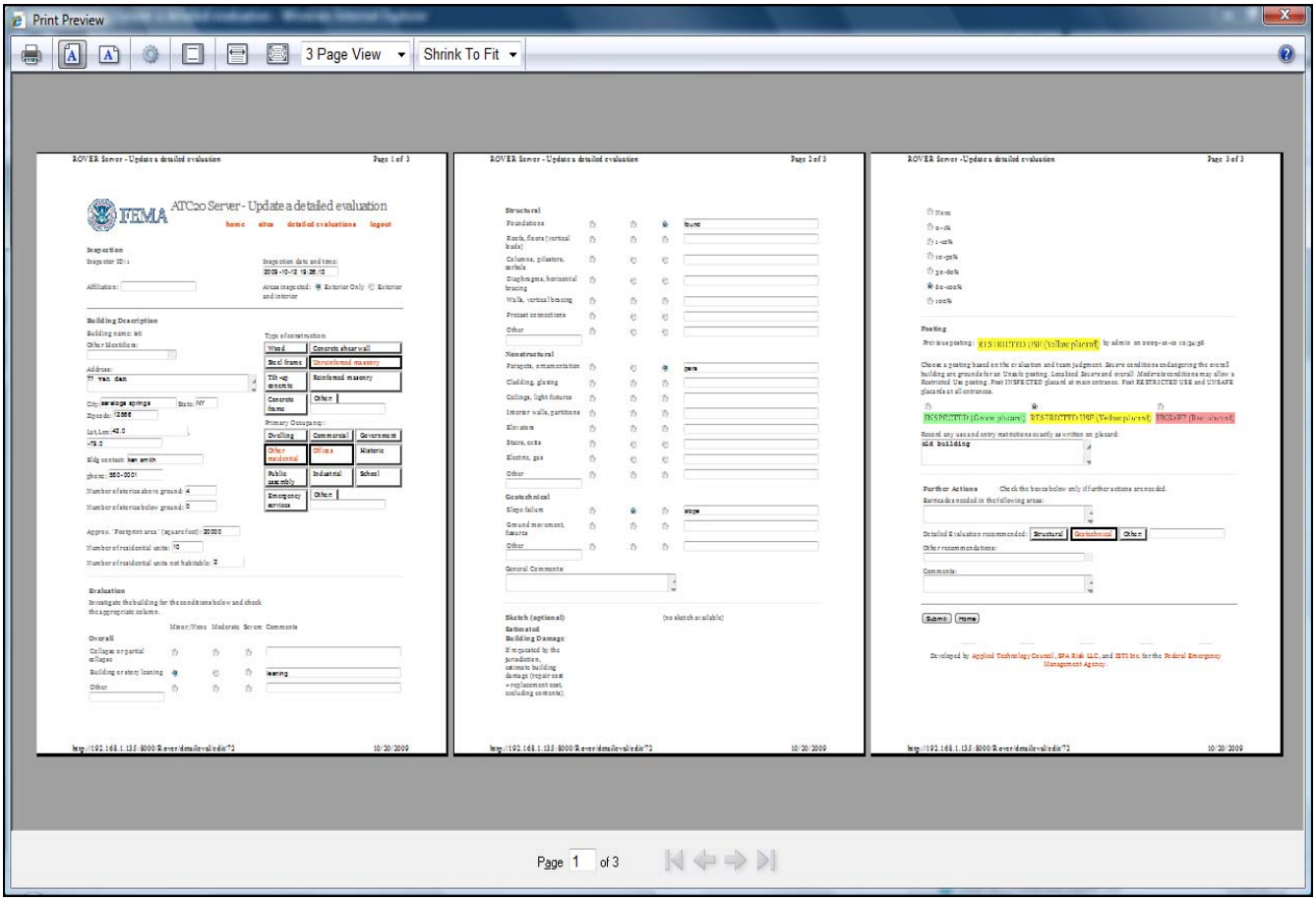


Figure 7. Print-ready forms of merged data for pre- and post-earthquake information

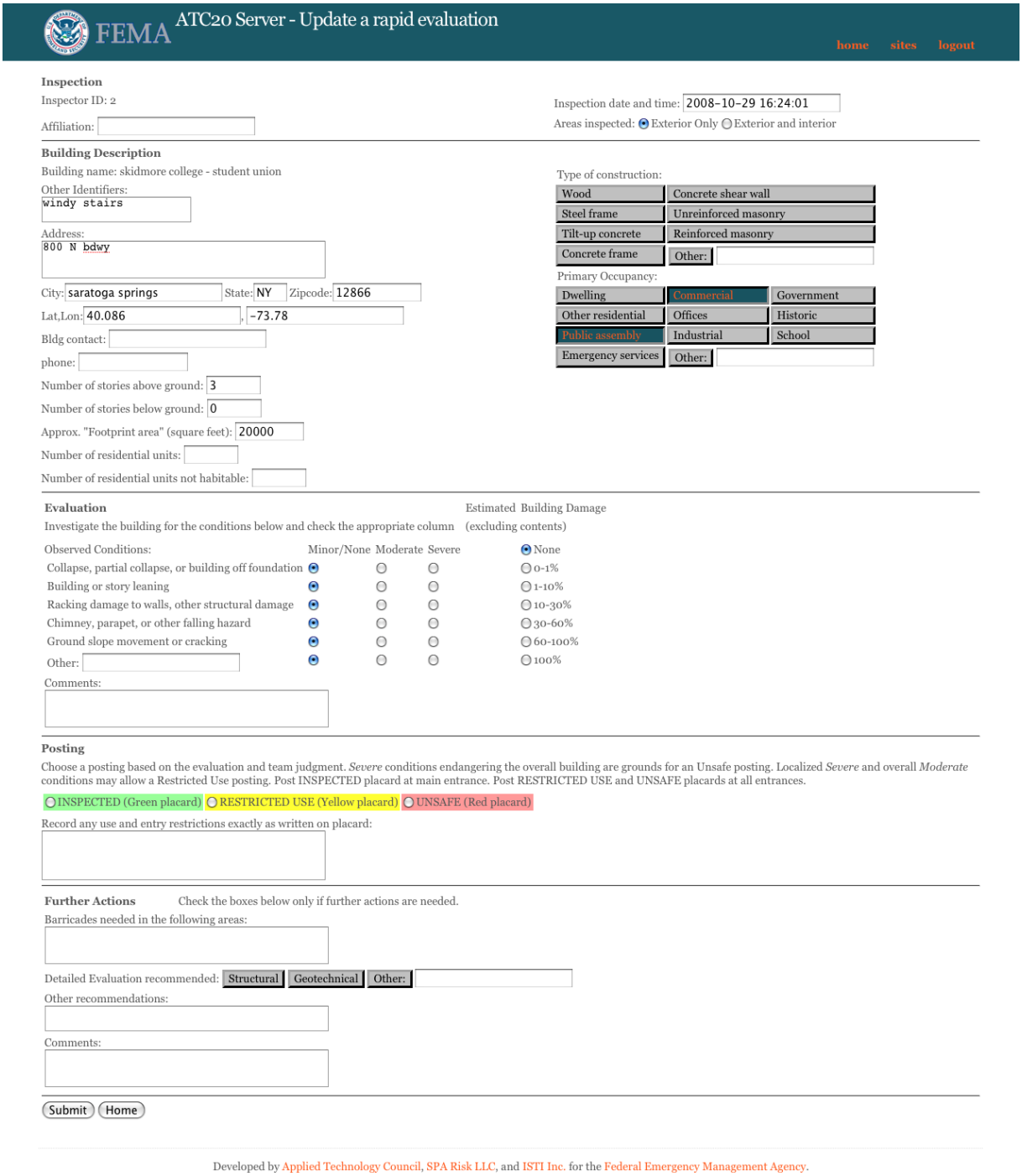


Figure 8. Merged pre- and post- earthquake data readily available on the server

- ***Automated, high-resolution hazard and soil lookup.*** ROVER's server contains both an integral soil database and an integral seismic hazard map of the entire United States. Both databases are products of the US Geological Survey (USGS). Using the exact latitude and longitude of the inspected buildings, ROVER automatically determines site-specific soil

and hazard and inserts them into the database, without requiring effort by the user, increasing the efficiency of the FEMA 154 methodology. The paper-based methodology, by contrast, requires the user to determine the National Earthquake Hazards Reduction Program (NEHRP) site soil classification of inspected buildings. This can require a labor-intensive process of geolocation and manual examination of paper maps. It also involves a fairly approximate high/medium/low seismic hazard classification scheme whose default is based on the highest hazard in the county in which the inspection takes place.

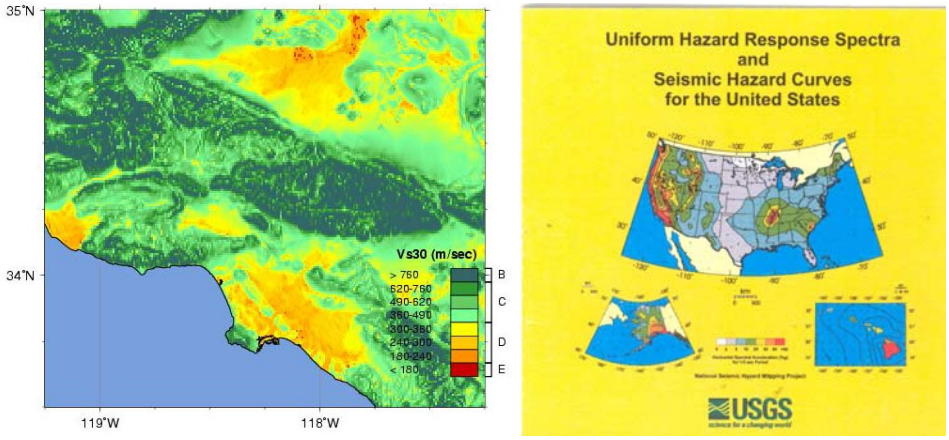


Figure 9. USGS's topographically derived soil database[1] and the National Seismic Hazard Maps[2]

- ***Enhanced accuracy of FEMA 154 risk score.*** Because soil and hazard are automatic and site specific, the risk score is also site-specific. The basic score increases the accuracy of the FEMA 154 process, reducing false positive identifications of buildings as potentially seismically hazardous. It further enhances the efficiency of detailed risk evaluations recommended by the FEMA 154 process.

- ***Integration with USGS ShakeCast.*** *ShakeCast* is free software developed by the US Geological Survey that monitors USGS data servers for the occurrence of earthquakes affecting facilities or other sites of interest and automatically provides color-coded alerts to indicate the likely damage to those facilities. It sends customized text or e-mail alerts to whomever the user chooses, based on estimated damage. The *ShakeCast* developers have created tools to allow users of both ROVER and *ShakeCast* to import their ROVER's FEMA 154 data to *ShakeCast*, and to send *ShakeCast's* estimates of likely ATC-20 tag color to ROVER's server within minutes after an earthquake occurs.

[1] Wald, D.J. and T.I. Allen, 2007. Topographic slope as a proxy for seismic site conditions and amplification. *Bulletin of the Seismological Society of America*, 97, pp. 1379-1395.

[2] Frankel, A.D., M.D. Petersen, C.S. Mueller, K.M. Haller, R.L. Wheeler, E.V. Leyendecker, R.L. Wesson, S.C. Harmsen, C.H. Cramer, D.M. Perkins, and K.S. Rukstales, 2002. *Documentation for the 2002 Update of the National Seismic Hazard Maps*, Open-File Report 02-420. U.S. Geological Survey, Golden, CO.

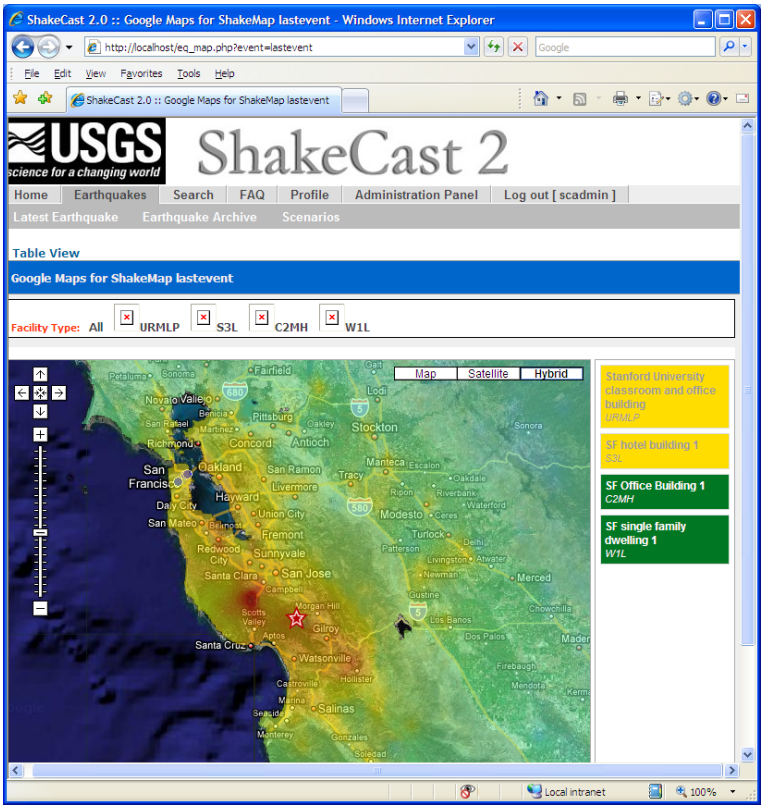
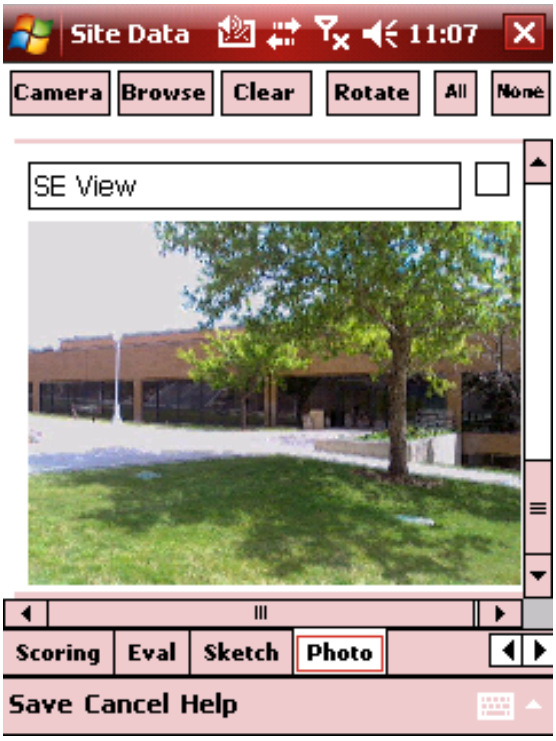

ShakeCast 2.0 :: Google Maps for ShakeMap lastevent - Windows Internet Explorer
http://localhost/eq_map.php?event=lastevent
File Edit View Favorites Tools Help
ShakeCast 2.0 :: Google Maps for ShakeMap lastevent
USGS science for a changing world
ShakeCast 2
Home Earthquakes Search FAQ Profile Administration Panel Log out [scadmin]
Latest Earthquake Earthquake Archive Scenarios
Table View
Google Maps for ShakeMap lastevent
Facility Type: All URMLP S3L C2MH W1L
Map Satellite Hybrid
Stanford University classroom and office building
URMLP
SF hotel building 1
S3L
SF Office Building 1
C2MH
SF single family dwelling 1
W1L
Local intranet
100%

Figure 10. ShakeCast 2

- ***Integral watermarked digital photographs.*** The paper version of FEMA 154 requires taking and attaching instant or digital photos to the inspection record which can be a time-consuming process. If this is not carefully handled, it can produce photos that lack strong connection to the inspection database. ATC-20 does not currently require the taking of digital photos because the labor involved in taking, collecting and attaching photos to the inspection record interferes with the urgent safety objectives of ATC-20.

  ROVER deals with both of these issues by using the built-in digital camera of the smartphone and automatically transfers photos to the server's database which automatically watermarks them with building names, locations and the date and time of the observation. This ensures that the photo is easy to take, strongly attached to the database and involves no additional labor on the part of the inspector than "point and shoot". ROVER allows the user to take an unlimited number of photos of each building, add comments/captions and store these in the database.



Sample ROVER site photo in the client database - ROVER integrates the smartphone camera to allow for multiple pictures per site. The user has the ability to take photos from the ROVER application or to browse and assign photos from the existing photo gallery. The user can also delete or rotate any photo and insert comments.

Sample photo on the server database - Photos appear with a watermark showing the screener, date, time, etc.

4 Microsoft Windows Mobile 5 or Above (WM5+) Smartphone Operation

Note: From this point forward, the Microsoft Windows Mobile 5 or above operating systems will be abbreviated as "WM5+"

Readers new to WM5+ must refer to the user manual of their phone for a full description of the operation and features of the phone. For example, details on the operation of a compatible phone such as the HTC Mogul smartphone can be found at:

http://www.sprint.com/cdma/assets/pdfs/phone_guides/htc/ppc_6800_ug.pdf

Users should always update their smartphone firmware to the newest version available before using ROVER. To update the firmware on the smartphone, refer to the manufacturer's website and directly download any patches or newer versions of the phone's firmware. Please make sure that all data on the phone is backed up on a computer or storage card prior to upgrading the firmware.

For issues or software updates relating to ROVER, please visit www.roverfound.com.

4.1 Basic Smartphone Operation

This section introduces the user to the basic operation of smartphones and common design elements found in most smartphones with touchscreens and keyboards. User manuals for smartphones are included with the purchase of the phones or can be obtained from the manufacturer's website for the specific phone. For example, the complete user manual for a Sprint HTC Mogul smartphone can be obtained from the following website:

http://support.sprint.com/global/pdf/user_guides/htc/mogul/htc_mogul_ug.pdf.

ROVER users must have basic familiarity with their smartphone and its general features including the use of the keyboard (physical and/or virtual) and data entry using the touchscreen and/or stylus, the camera, Bluetooth, general file management and accessing programs.

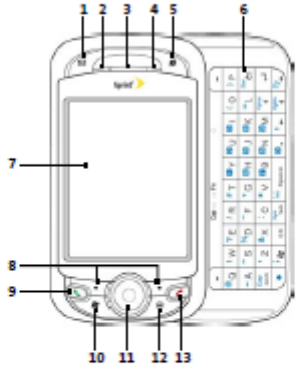
4.1.1 General Device Components

Several features are common to smartphones and regardless of the physical location on the phone; these features operate in the same manner. For example, the sample components of a Sprint Mogul HTC phone are displayed below. These pages are extracted from the User Guide from the following website:

http://support.sprint.com/global/pdf/user_guides/htc/mogul/htc_mogul_gsg.pdf

1.2 Your Device

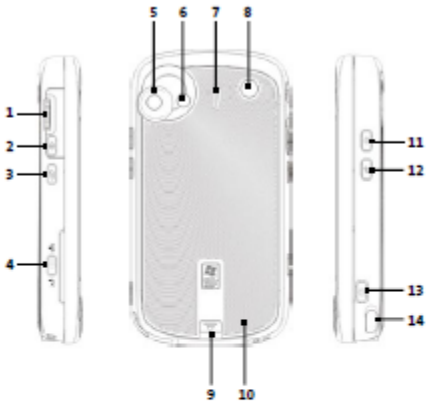
Front Components



1. **Messaging Key** — Press to access your messages.
2. **Notification LED 1** — Bi-color LED on the left side: Blue and Green for Bluetooth status and availability, and Wi-Fi status. When both Bluetooth and Wi-Fi are enabled, blue and green lights blink alternately.
3. **Earpiece** — Listen to a phone call from here.
4. **Notification LED 2** — Bi-color LED on the right side: Green and Orange for CDMA standby, SMS message, CDMA network status, notification, battery charging status.
5. **Web Key** — Press to open Internet Explorer Mobile.

6. **Hardware Keyboard** — This is a QWERTY-style keyboard just like the computer keyboard. Slide the touch-screen panel to the left to reveal the keyboard. For more information, see "Using the Hardware Keyboard" in Section 2.
   Note: The protective film on the sliding keyboard can be removed.
7. **Touch Screen** — Tap the screen with the stylus to write, draw, or make a selection.
8. **Left and Right Softkeys** — Press to perform the command shown in the label above the button.
9. **Talk Key** — Press to answer an incoming call or dial a number.
10. **Start Key** — Press to open the Start menu.
11. **NAVIGATION Control/ ENTER** — Press this multi-directional control up, down, left, or right to move through menus and program instructions; carry out the selection by pressing ENTER (the center button).
12. **OK Key** — Press to confirm your data entries, or to exit the program in use.
13. **End Key** — Press to end a call or to return to the Today screen.

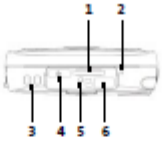
Left, Back and Right Components



1. Jog Wheel	While on the Today screen or using applications, scroll up or down to navigate through menus or program instructions; press the wheel to carry out a selection. During a call or while playing music, scroll up or down to adjust the sound volume.
2. OK Key	Press to confirm your data entries, or to exit the program in use.
3. Voice Command Key	Press to start Voice Speed Dial; press and hold to record a voice note.
4. WLAN Switch	Slide up to turn Wi-Fi on, down to turn Wi-Fi off.
5. Camera	Use the camera to take still photos and record video clips.

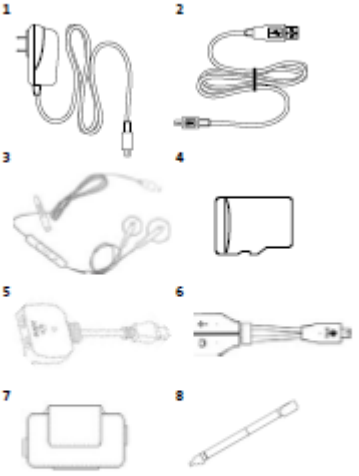
6. Flash Light	Allows you to capture images even in a dark environment. To turn on the flash, tap the Flash icon ( ) when in Camera mode.
7. Speaker	Listen to media from here.
8. Car Antenna Connector	Connect your device to an external antenna if you need better reception.
9. Battery Cover Latch	Press downward to release the battery cover.
10. Battery Cover	After pressing down the cover latch, remove the battery cover to access the battery compartment.
11. Power Key	• Press and hold to turn on the power. • Press to turn off the display temporarily. This switches your device to Sleep mode. You can still receive calls and messages when your device is in Sleep mode. • Press and hold (for about five seconds) to turn off the power completely. All functions including the phone will be unavailable for use.
12. Comm Manager Key	Press to open the Comm Manager. Comm Manager lets you easily turn on/off your device's connections (such as Bluetooth, Wi-Fi, and cellular data connection), ringer, phone, etc.
13. Camera Key	Press and hold for two seconds to launch the camera. Press again to take a picture.
14. Stylus and Stylus Slot	Use the stylus to write, draw, or select items on the touch screen.

Bottom Components

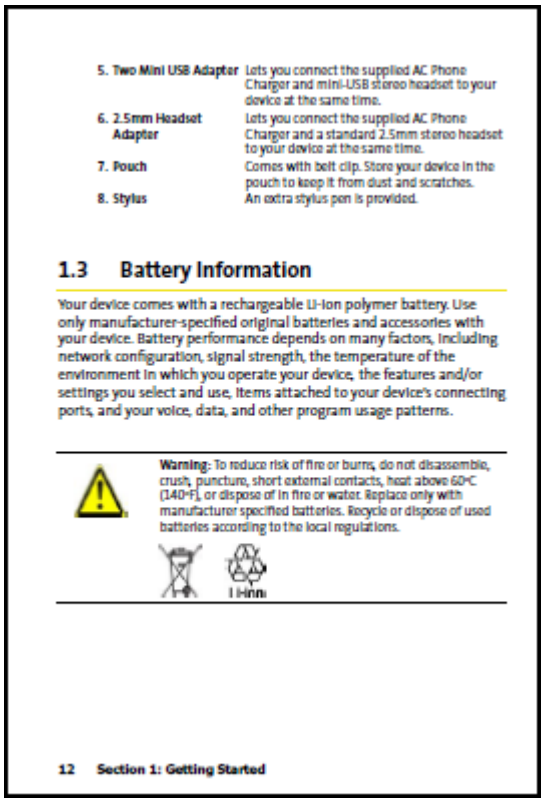


1. microSD Card Slot	Insert a microSD memory card for storing data.
2. Microphone	Speak into the microphone when receiving or making a phone call or when recording a voice note.
3. Strap Holder	Attach a strap for carrying your device.
4. Infrared Port	Exchange files or data with other devices wirelessly.
5. RESET Button	With the stylus, press the RESET button to soft-reset your device.
6. Sync Connector/ Earphone Jack	Connect the supplied power adapter to charge the battery or the USB Sync cable to synchronize data with your PC. You can also plug in the provided splitter adapter to allow the power adapter and stereo headset to be connected to your device at the same time.

Accessories



1. AC Phone Charger	Recharges the battery.
2. USB Sync cable	Connects your device to a PC and synchronizes data.
3. Mini-USB Stereo headset	Provides a volume control slider and a Send/End button. Press the Send/End button to pick up a call or put a call on hold; press and hold the button to end the call.
4. microSD card	The storage card is already installed in your device.



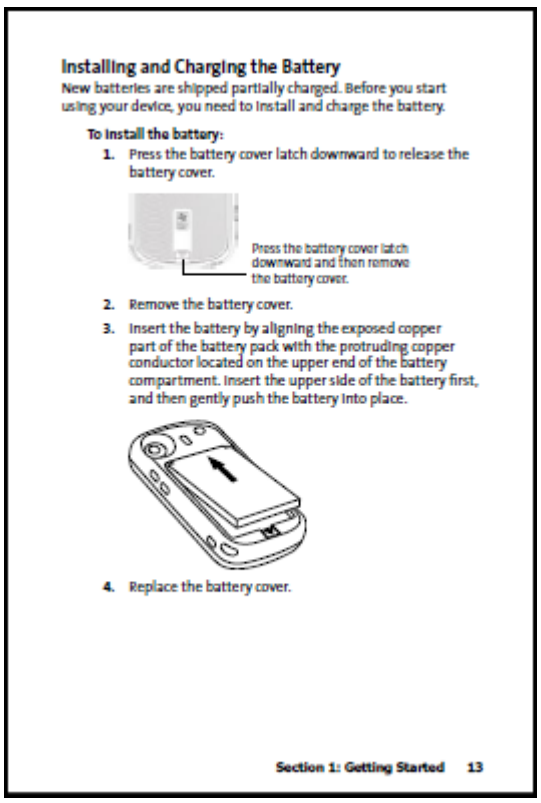
5. **Two Mini USB Adapter** Lets you connect the supplied AC Phone Charger and mini-USB stereo headset to your device at the same time.
6. **2.5mm Headset Adapter** Lets you connect the supplied AC Phone Charger and a standard 2.5mm stereo headset to your device at the same time.
7. **Pouch** Comes with belt clip. Store your device in the pouch to keep it from dust and scratches.
8. **Stylus** An extra stylus pen is provided.

1.3 Battery Information

Your device comes with a rechargeable Li-ion polymer battery. Use only manufacturer-specified original batteries and accessories with your device. Battery performance depends on many factors, including network configuration, signal strength, the temperature of the environment in which you operate your device, the features and/or settings you select and use, items attached to your device's connecting ports, and your voice, data, and other program usage patterns.

Warning: To reduce risk of fire or burns, do not disassemble, crush, puncture, short external contacts, heat above 60°C (140°F), or dispose of in fire or water. Replace only with manufacturer specified batteries. Recycle or dispose of used batteries according to the local regulations.

12 **Section 1: Getting Started**



Installing and Charging the Battery

New batteries are shipped partially charged. Before you start using your device, you need to install and charge the battery.

To install the battery:

1. Press the battery cover latch downward to release the battery cover.

Press the battery cover latch downward and then remove the battery cover.

2. Remove the battery cover.
3. Insert the battery by aligning the exposed copper part of the battery pack with the protruding copper conductor located on the upper end of the battery compartment. Insert the upper side of the battery first, and then gently push the battery into place.
4. Replace the battery cover.

Section 1: Getting Started 13

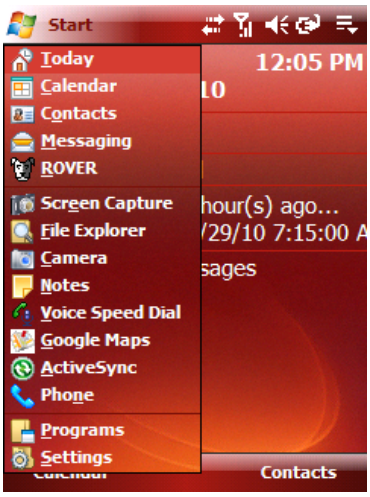
4.1.2 Smartphone Navigation Screens

The following is a brief description of the typical screens that a user will navigate to accomplish specific tasks or access applications on a smartphone. Again, the user should consult the smartphone manual or user guide for details specific to the phone.

The Today Screen: The Today Screen displays information such as appointments and status indicators. The status indicators are represented by symbols described in the phone's user guide. One can navigate to the different options presented on this screen by tapping the option.

- To access the Today screen from any screen, tap **Start > Today**

The Start Menu: The Start Menu is located at the top left corner of the Today screen. Tapping on Start displays a list of programs on the phone and allows one to switch from one program to the other, either by tapping on the program as it pops up in Start with the stylus or by scrolling through the program list and pressing enter. Notice the "ROVER" program on the Start menu shown below.



5 Installation Instructions

The electronic installation files can be obtained from ROVER Development Partners Foundation at www.roverfound.com/rover. This site provides pointers to two computer files: (1) the ROVER server installation file ROVERServerSetup.exe and, (2) the ROVER WM5+ client installation file ROVERClientSetup.CAB.

5.1 Installation Guide for ROVER Software

5.1.1 Procedure for Installing the Server Software

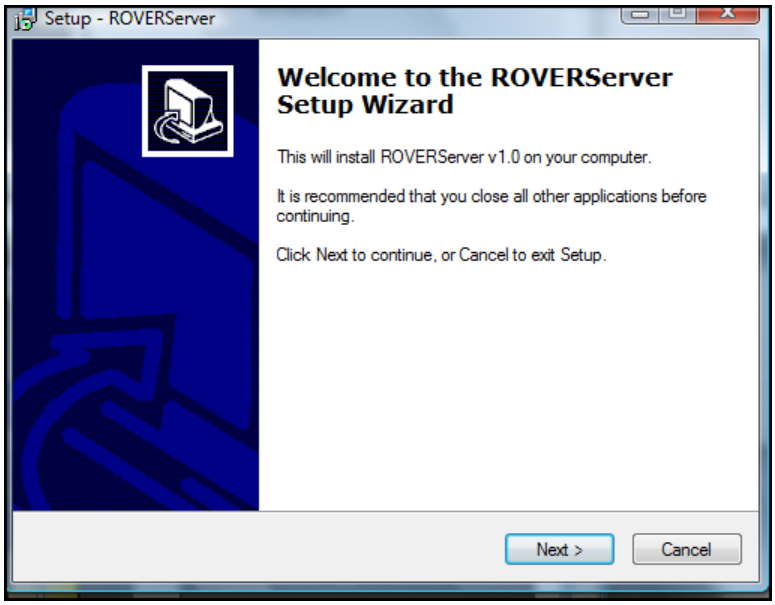
If an older version of the software exists on the desktop, uninstall it. To install the new version:

Step 1. Launch an internet browser on a desktop

Step 2. Type the following URL: www.roverfound.com

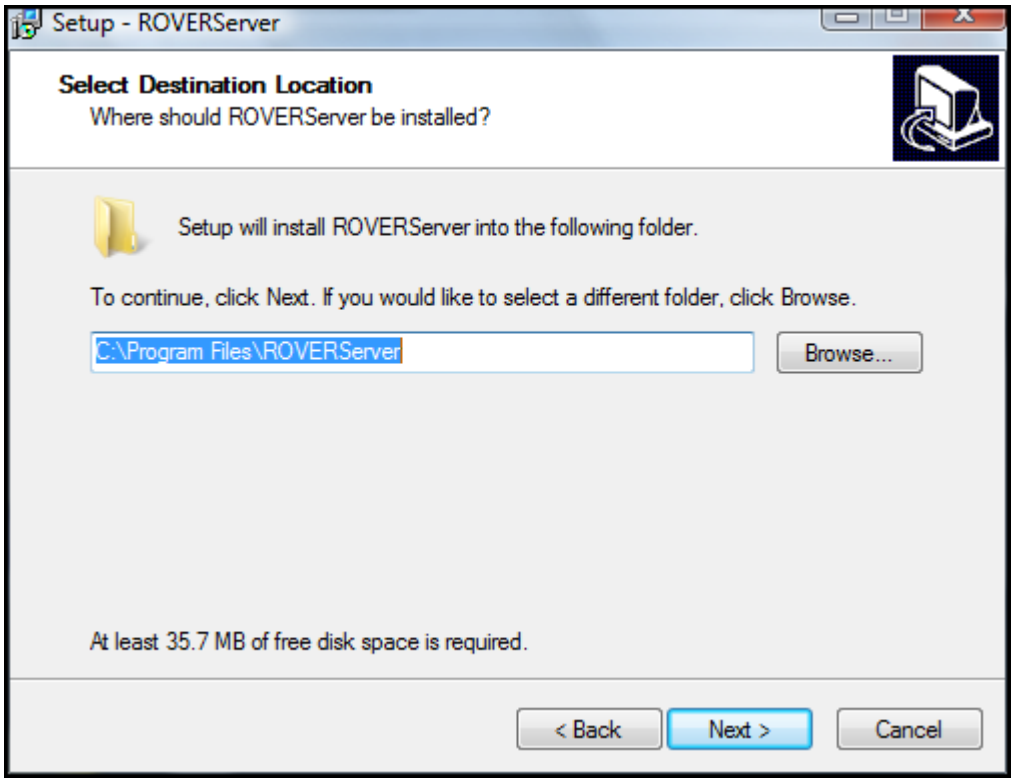
Step 3. Find and download the executable file: **ROVER-Server-Installation-Software.exe** onto the desktop

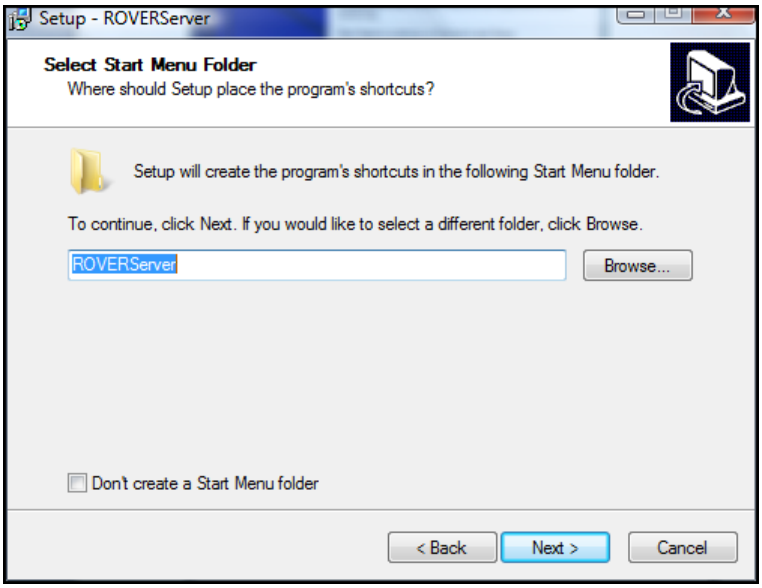
Step 4. Double click on the **ROVER-Server-Installation-Software.exe** file

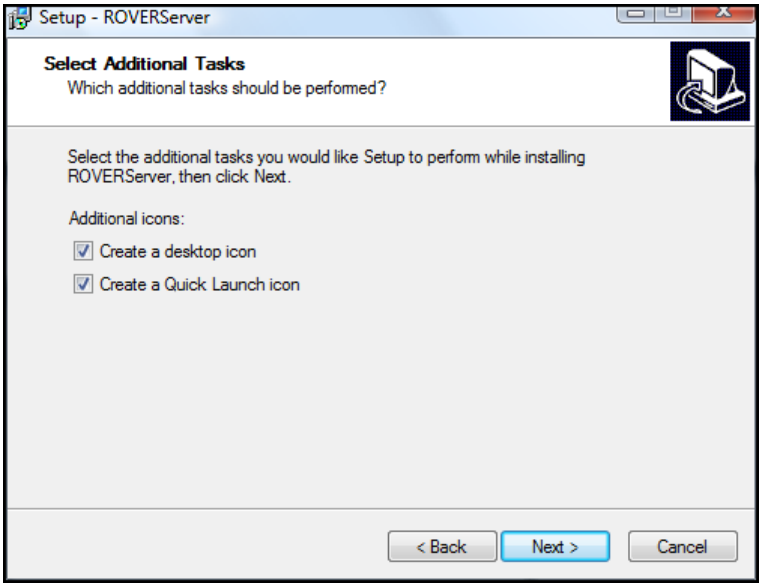

Setup - ROVERServer
Welcome to the ROVERServer Setup Wizard
This will install ROVERServer v1.0 on your computer.
It is recommended that you close all other applications before continuing.
Click Next to continue, or Cancel to exit Setup.
Next >
Cancel

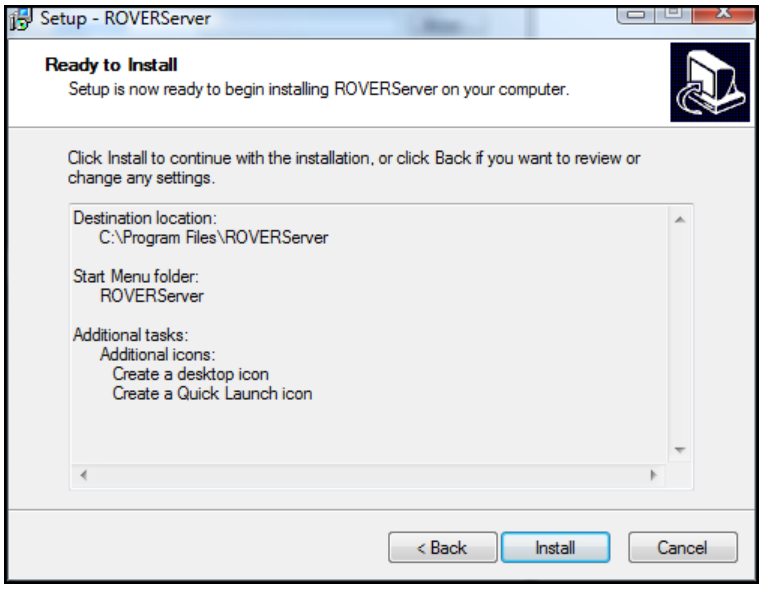
Step 5.

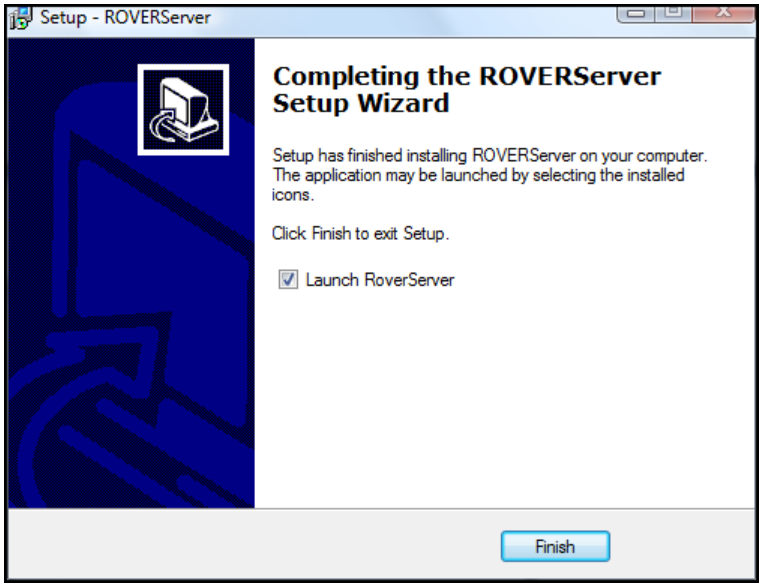
Follow the steps in the ROVERServer Setup Wizard as shown in the following screens.


Setup - ROVERServer
Select Destination Location
Where should ROVERServer be installed?
Setup will install ROVERServer into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Program Files\ROVERServer
Browse...
At least 35.7 MB of free disk space is required.
< Back
Next >
Cancel


Setup - ROVERServer
Select Start Menu Folder
Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder.
To continue, click Next. If you would like to select a different folder, click Browse.
ROVERServer
Browse...
Don't create a Start Menu folder
< Back
Next >
Cancel

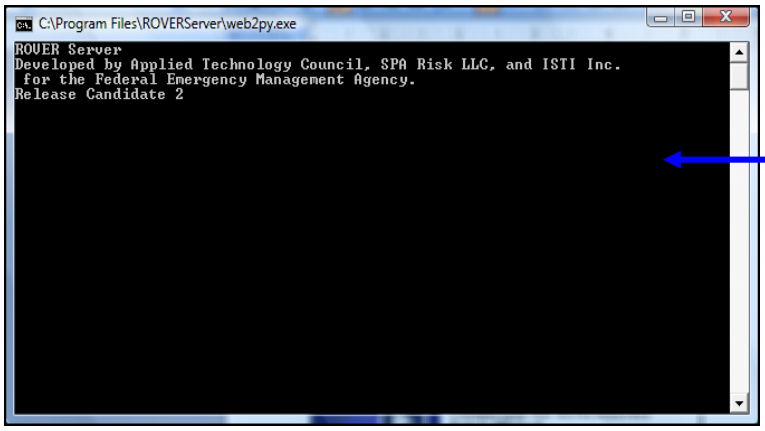

Setup - ROVERServer
Select Additional Tasks
Which additional tasks should be performed?
Select the additional tasks you would like Setup to perform while installing ROVERServer, then click Next.
Additional icons:
Create a desktop icon
Create a Quick Launch icon
< Back
Next >
Cancel


Setup - ROVERServer
Ready to Install
Setup is now ready to begin installing ROVERServer on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
C:\Program Files\ROVERServer
Start Menu folder:
ROVERServer
Additional tasks:
Additional icons:
Create a desktop icon
Create a Quick Launch icon
< Back
Install
Cancel


Setup - ROVERServer
Completing the ROVERServer Setup Wizard
Setup has finished installing ROVERServer on your computer. The application may be launched by selecting the installed icons.
Click Finish to exit Setup.
Launch RoverServer
Finish

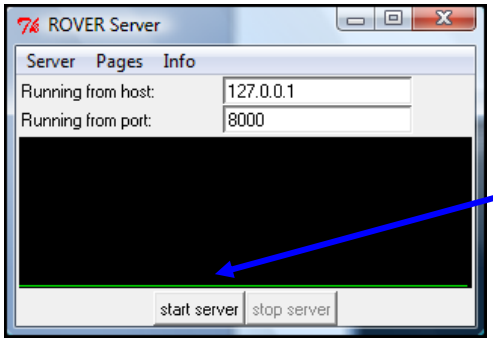
Step 6.

Click **Finish** to exit the Setup and launch ROVER.


C:\Program Files\ROVERServer\web2py.exe
ROVER Server
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc.
for the Federal Emergency Management Agency.
Release Candidate 2

Step 7.

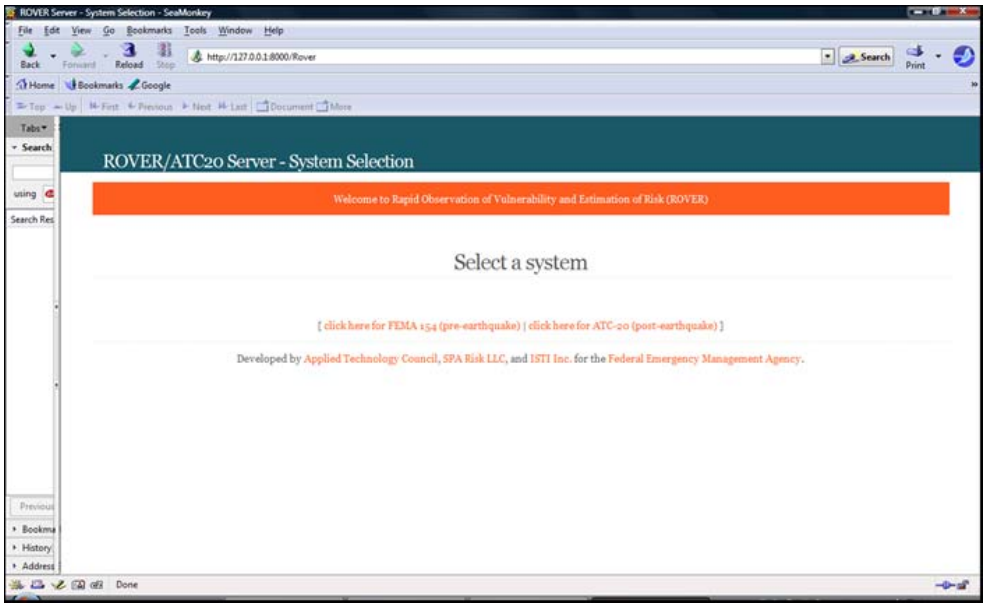
The following terminal screen and the ROVER Server startup screen appear.



Step 8.

Click on **start server.** This will navigate to the **ROVER/ATC-20 Server – System Selection** screen.

See **Section 9** for further information.


ROVER Server - System Selection - SeaMonkey
ROVER/ATC20 Server - System Selection
Welcome to Rapid Observation of Vulnerability and Estimation of Risk (ROVER)
Select a system
[click here for FEMA 154 (pre-earthquake) | click here for ATC-20 (post-earthquake)]
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.

5.1.2 Procedure for Installing the Client Software on a WM5+ Smartphone

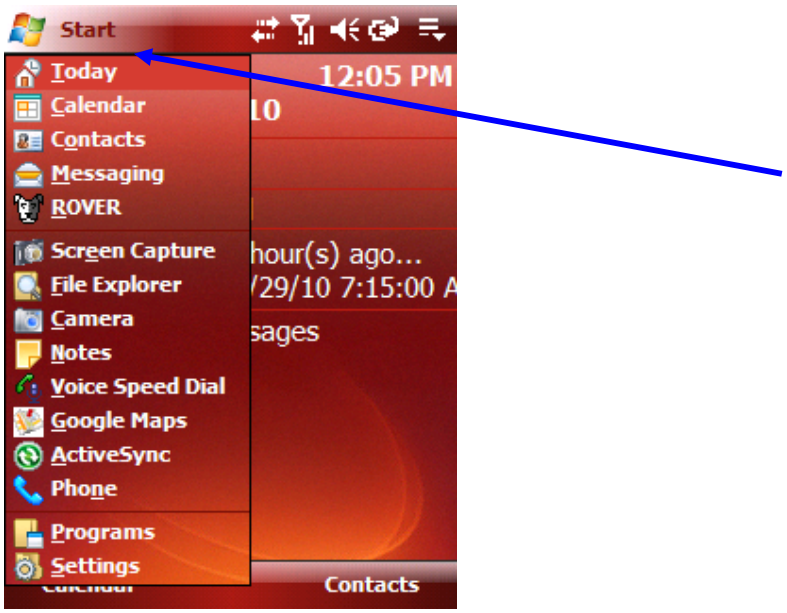
To install the client software on a smartphone, first obtain the installation file, **ROVERClientSetup.CAB**, from the website mentioned above. Use *any* of the following methods to install the file onto the smartphone:

1. From the smartphone, launch a web browser (e.g., Start → Internet Explorer) and obtain **ROVERClientSetup.CAB** directly from the site by typing the URL from above.

2. From a PC, download **ROVERClientSetup.CAB** from the website onto the desktop. Connect the smartphone and the desktop with a cable and via ActiveSync export **ROVERClientSetup.CAB** to the smartphone.

3. From a PC, download **ROVERClientSetup.CAB** from the website onto the desktop, then copy it to a storage chip that is compatible with the smartphone (e.g., many phones have a slot for a microSD chip and there are USB adapters that allow one to plug the chip into the PC). Take the chip out of the PC and put it in the smartphone.

Once **ROVERClientSetup.CAB** has been imported to the smartphone, ROVER can be installed using the following steps:

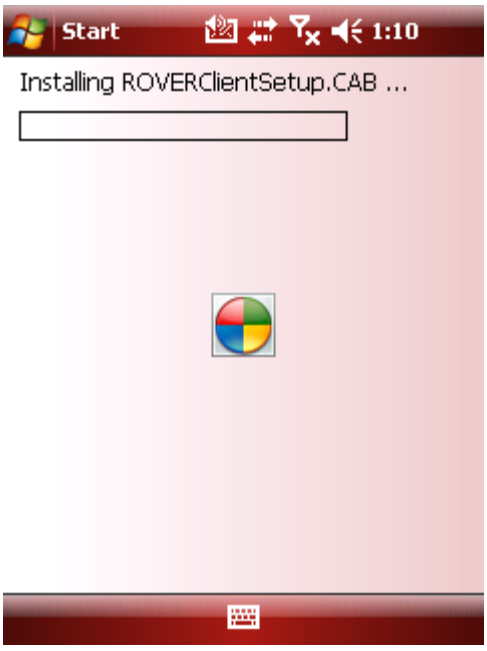


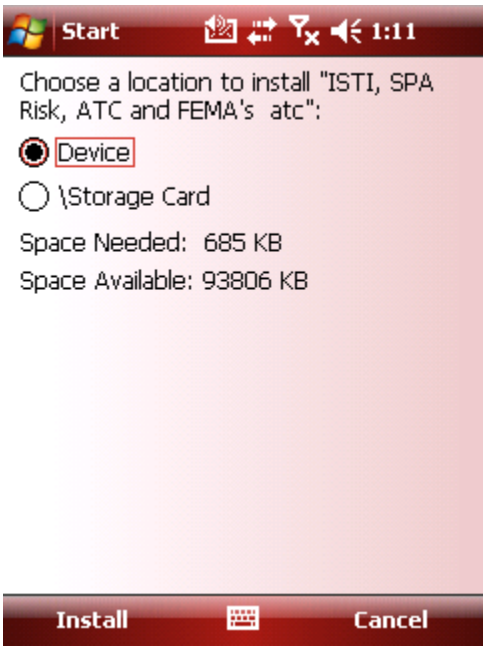
Step 1.

From the **Start** menu, tap on **File Explorer**.

Step 2.

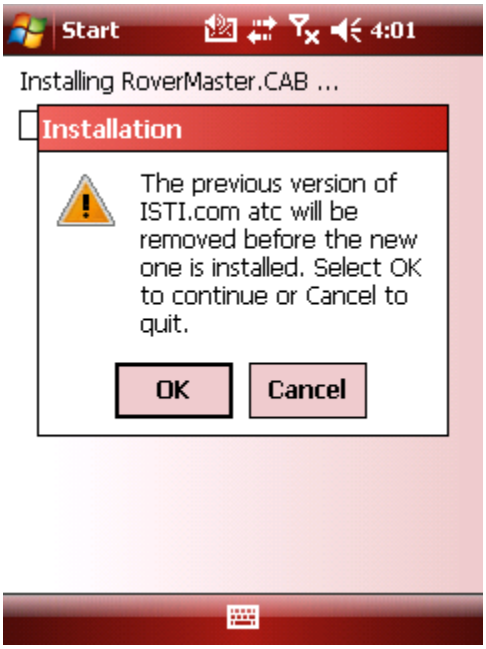
Tap on **ROVERClientSetup.CAB**. This file is approximately 700 Kb.





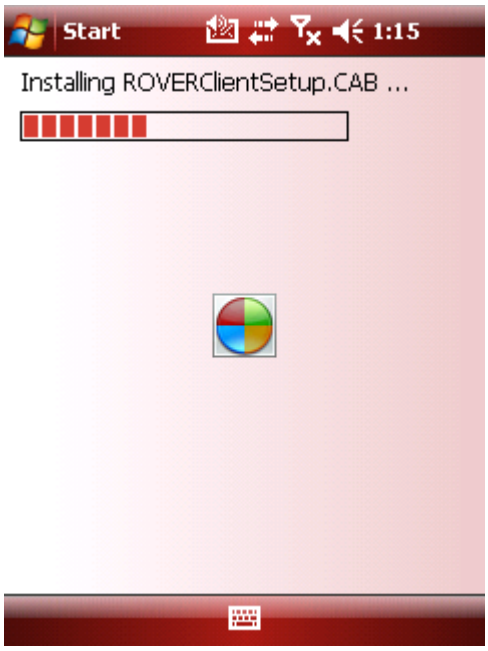
Step 3.

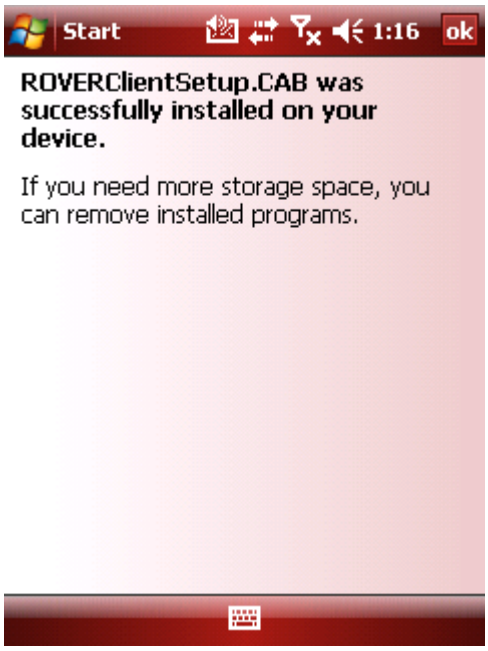
Tap on **Device**.


Start
4:01
Installing RoverMaster.CAB ...
Installation
The previous version of ISTI.com atc will be removed before the new one is installed. Select OK to continue or Cancel to quit.
OK
Cancel

Step 4.

If overwriting a previous version, tap OK when the message appears. **This will continue the installation process only, and will not modify data previously entered in ROVER.**




Start
1:16
ok
ROVERClientSetup.CAB was successfully installed on your device.
If you need more storage space, you can remove installed programs.

5.1.3 Procedure for Installing a Printer

This feature is currently under development for the ROVER Client Application.

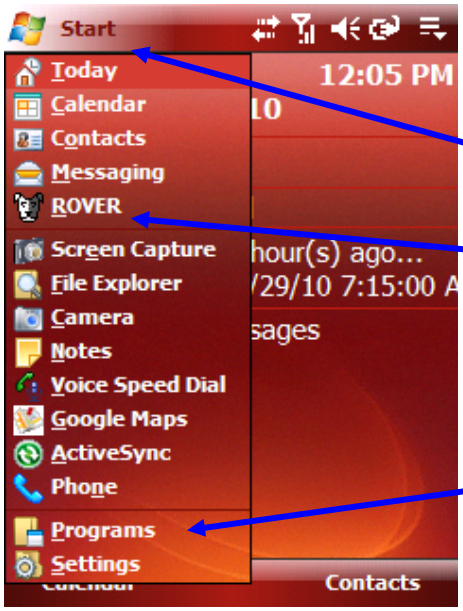
6 Using the ROVER Client with a WM5+ Smartphone

6.1 Launching the Application

ROVER can be launched on the smartphone several different ways:

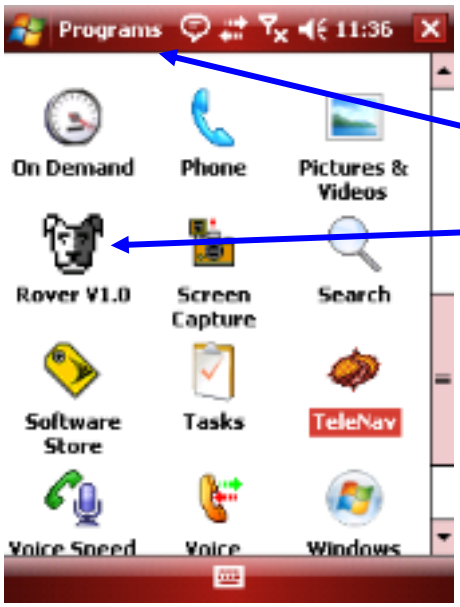
- Tapping **Start** at the top left of the screen will display a menu of options on the left half of the screen with **ROVER** as one of the items. Tapping on **ROVER** will navigate the user to the application.
- Alternatively, the **Program** screen from the **Start** icon will navigate the user to another screen with **ROVER** as one of the program options. Tapping on **ROVER** will navigate the user to the application.

Note: The background and screen theme colors of the sample **ROVER** screens that appear are determined by the user's defined **Settings** and can differ from one phone to the next.

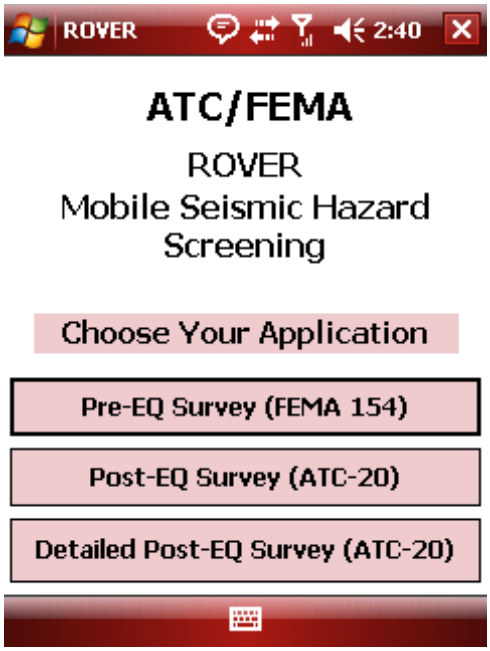


Choice 1. Access ROVER by clicking on **Start**, and tap on **ROVER**.

Choice 2. Access **ROVER** by clicking on **Programs**.



Choice 2. Access ROVER via the **Programs** Screen. Tapping on the **ROVER** icon will navigate to the ROVER Startup screen shown below.

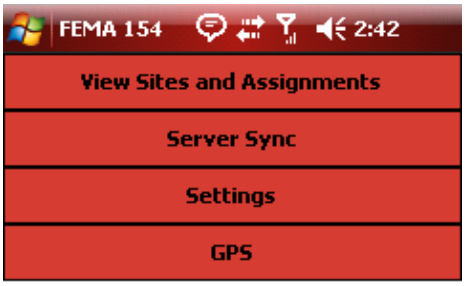


ROVER Startup Screen.

Note: Each of the listed Surveys (Pre-EQ, Post-EQ, and Detailed Post-EQ) in the startup screen is a separate module sharing a common database. To perform a different type of survey, one must first **Exit** the application after completing data entry and **re-launch** ROVER.

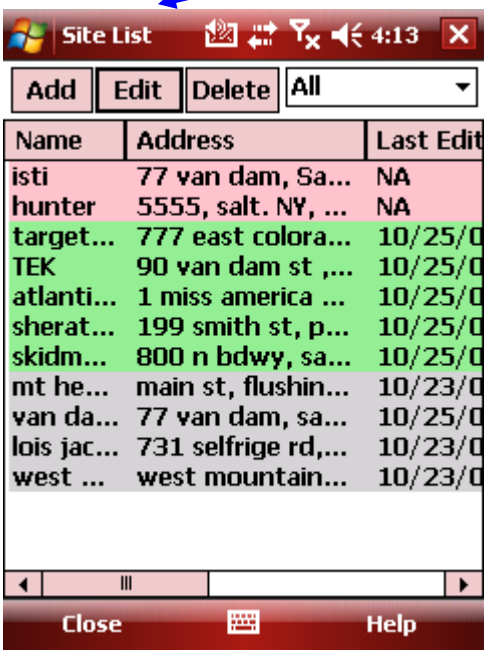
6.2 Add, Edit, Delete Features in the Survey Site List

Choosing a Survey by tapping on it in the ROVER Startup Screen navigates to the main menu for that Survey.



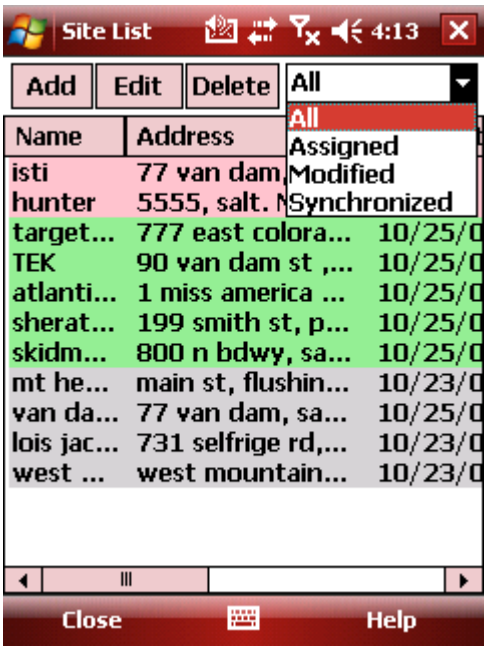
The main menu for **Pre-EQ Survey (FEMA 154)** is displayed after tapping it in the startup screen.

Clicking **View Sites and Assignments** will navigate to the **Site List** screen displaying the list of sites in the database.



Note the options at the top of the screen: ***Add, Edit, Delete,* and a pull-down menu with four choices *(All, Assigned, Modified, Synced).*** Both ***Add*** and ***Edit*** will guide the user to enter new or edit existing information through a series of tabs. ***Delete*** will delete the highlighted site.

Data entry on the phone is analogous to the paper versions of FEMA 154 and ATC-20 worksheets.



The pull-down menu allows a user to sort the sites according to four choices. The choices will display the sites according to the following color codes:

- "*All*" displays the full list of sites sorted by the colors pink, green and grey
- "*Assigned*" displays the list of sites assigned to a certain user/inspector in pink
- "*Modified*" displays sites recently updated but not yet synchronized with the server in green
- "*Synchronized*" displays sites that have been synchronized with the server in grey.

The user can enter data in the following manner:

- Use the stylus along with the virtual keyboard (click on the keyboard icon at the bottom of the screen);
- Use the smartphone's keyboard. This will usually rotate the working screen into a landscape mode for ease of view and entry.

6.3 Using a Bluetooth GPS Device during an Inspection

6.3.1 Overview

During an inspection, a Bluetooth GPS device can be used to record the site's latitude and longitude along with a time record of the inspection in ROVER. For full details on how to configure a GPS device with the smartphone, please refer to Sections 7.4.1 and 7.4.2.

To capture building latitude and longitude, the user must first ensure that the smartphone is aware of the GPS device and the two are communicating. This process is referred to as "pairing" or "partnering" the GPS device with the smartphone, by assigning one of several communication ports (COM ports) on the smartphone to the GPS device via Bluetooth. Once assigned, only this COM port will be used by ROVER to communicate with the GPS device. Prior to conducting an inspection using a GPS device, the user must ensure the following:

- The GPS device is on and acquiring its position (which generally means putting the device outside or at least in a window with a broad view of the sky)
- The Bluetooth radio is turned on in the smartphone
- A communication port on the smartphone has been assigned to the GPS device (in WM6, this done via the External GPS Systems settings control panel, as detailed later)
- The smartphone has recognized the GPS (the two devices have been paired)
- In ROVER, the **GPS** feature can detect latitude and longitude readings from the **Test Port** button, as described shortly

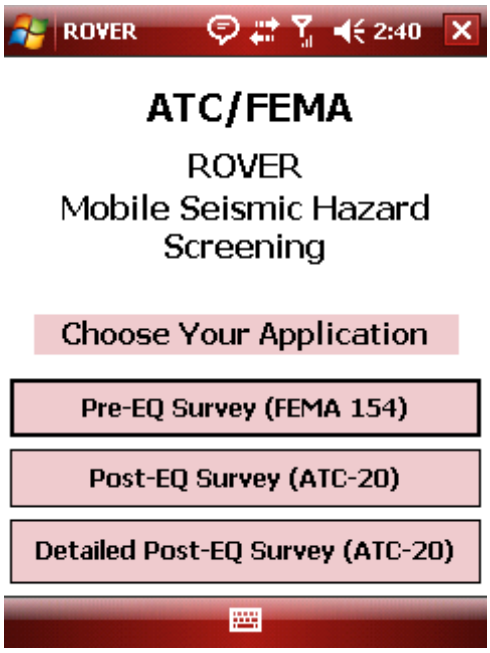
Note: Please refer to Sections 7.4.1 and 7.4.2 for full details on how to identify and pair the GPS device with the smartphone.

6.3.2 Communication Between ROVER and GPS Device

Note: ROVER designates latitude and longitude values in decimal degrees, e.g., north latitudes and east longitudes are positive values (+) and south latitudes and west longitudes are negative values (-).

When using a GPS device during the inspection, ensure that the smartphone and GPS are communicating. To check for connection:

- From the ROVER Startup screen, tap on the survey being conducted

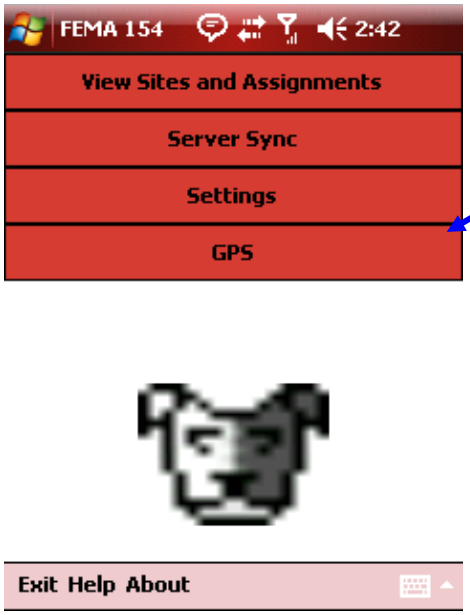


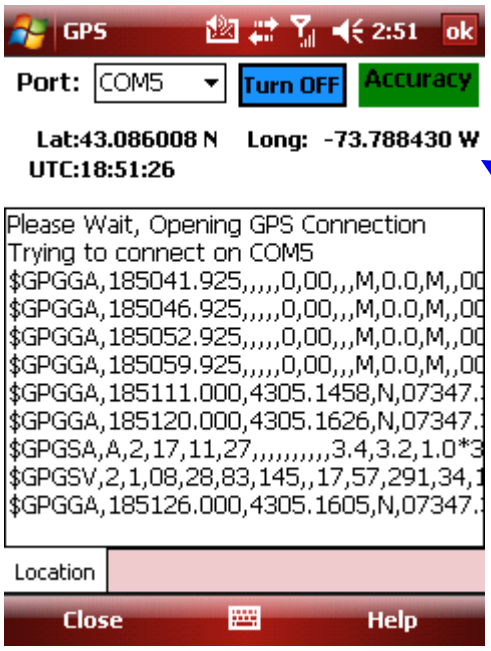
Step 1.

Tap on the desired survey. This will navigate to the Survey's main menu.

Step 2.

In the main menu tap on **GPS**.





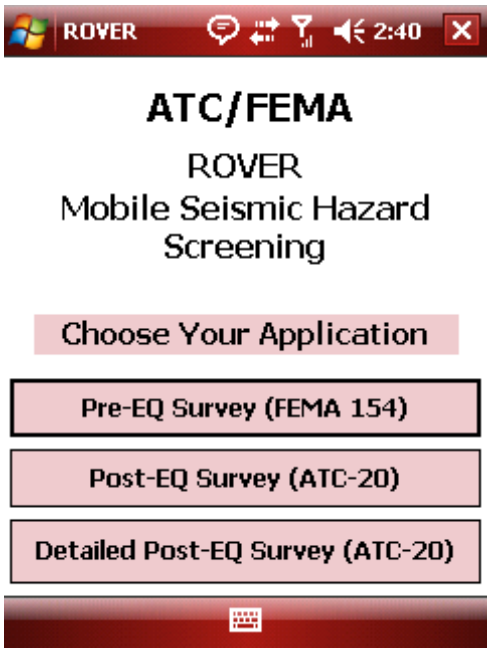
Step 3.

- The **Port** setting should match the port assigned to the GPS device in use (*COM5* in this case has been assigned to Deluo GPS – see **Section 7.4.2**)
- Observe the screen for latitude and longitude data in decimal degrees scrolling along the screen, as well as **Lat, Lon**, and **UTC** data displayed. This indicates a successful GPS connection, and may take several moments or until the GPS device has located its position.
- If the GPS device indicates that it has located its position (as described in the GPS user manual), but no Lat/Lon/UTC info is being displayed, close the window, and tap on **Settings**.
- Follow the steps outlined in **Section 7.4.1.1 and 7.4.1.2** to establish connection.

6.4 Pre-Earthquake Rapid Visual Screening (FEMA 154)

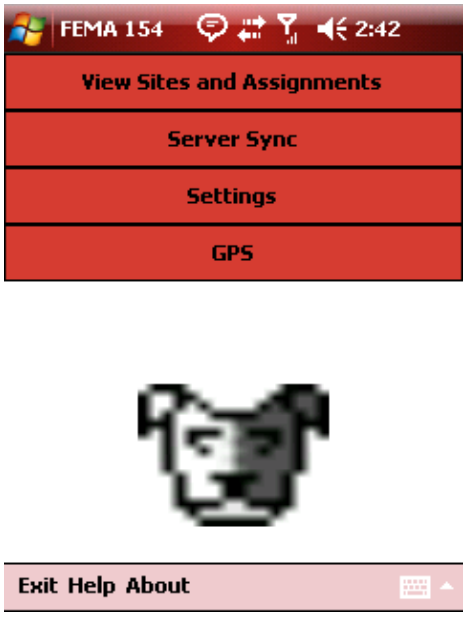
Conducting a pre-earthquake rapid visual screening using ROVER is analogous to conducting a survey using the paper version of FEMA 154 (less constructing a database, transcribing paper records, correlating photos and sketches with data, etc., which are handled automatically by ROVER). The user can add new sites or modify existing sites without re-entering data, and can store, archive and recall information on the server's database. All pre-earthquake building information is available for use in post-earthquake surveys.

6.4.1 The Pre-Earthquake Survey: View Sites and Assignments



Step 1.

In the ROVER main menu tap on **Pre-EQ Survey (FEMA 154)**.

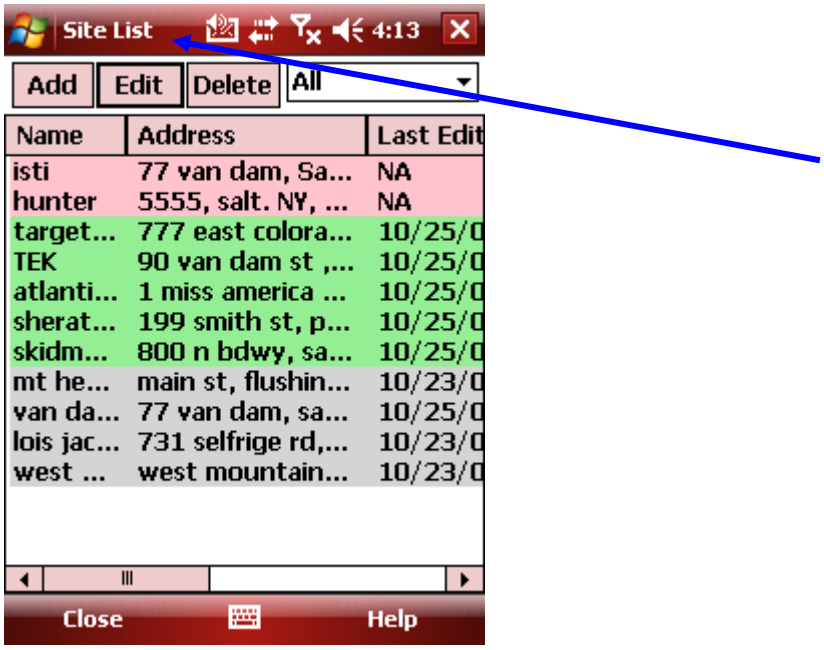


Step 1.

If using a GPS device, follow the steps in **Section 6.3.2** to ensure communication between ROVER and the GPS.

Step 2.

Tap on **View Sites and Assignments**.



Step 3.

This will navigate to the **Site List** screen displaying the list of sites in the database.

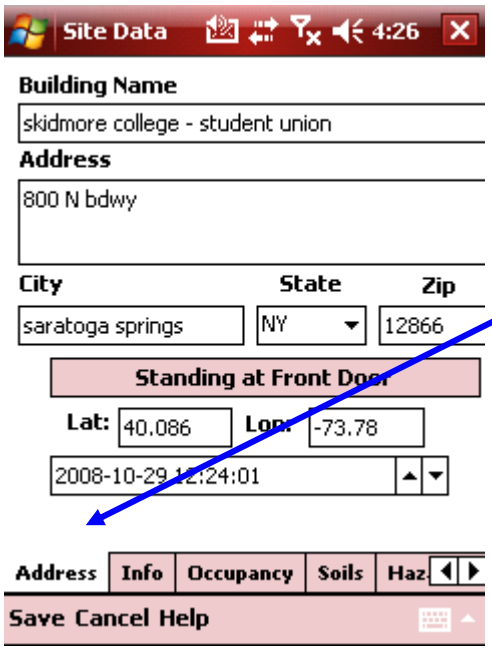
6.4.1.1 Pre-EQ Survey: Viewing/Editing Existing Sites

Note: The site "Skidmore College-Student Union" will be used throughout this example.

To edit existing sites, tap on the name of the site, in this example, "Skidmore College-Student Union" and then tap ***Edit***. This will open an **Address** tab; several other tabs are listed at the bottom of the screen. Selecting any tab will navigate to a screen that allows the user to enter new or edit existing data for that site. These tabs emulate the FEMA 154 inspection form. When data entry is completed in each tab, the user can advance to other tabs by tapping on the tab or using the forward and backward scroll arrows to display further tabs.

Step 1.

Tap on **skidmore college-student union** to highlight the selection and tap **Edit**.

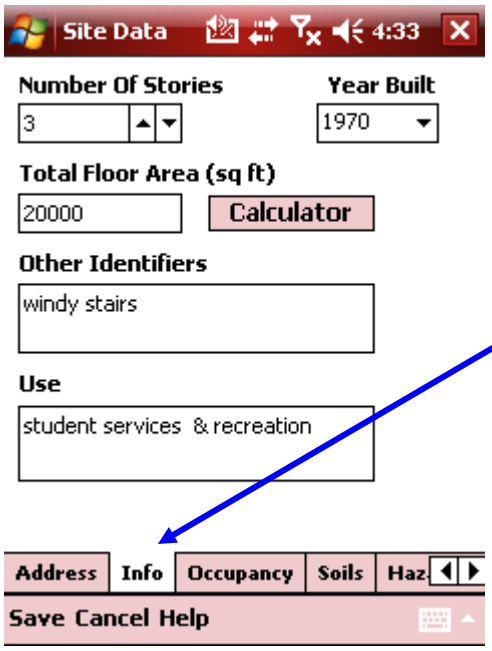


Step 2.

In the **Address** Tab enter address information.

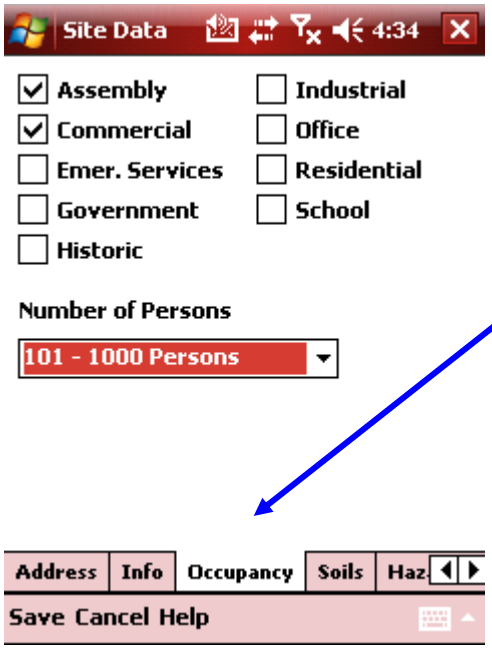
If the Bluetooth GPS unit is on and tracking, tapping on **Standing at Front Door** will automatically enter the latitude and longitude (in decimal degrees) of the GPS device and the current time.

Otherwise, the user can manually enter the latitude and longitude.



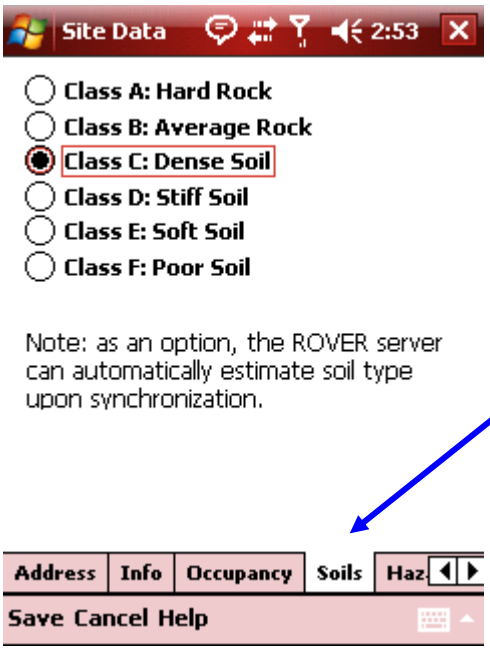
Step 3.

Tap on the **Info** Tab and enter information.



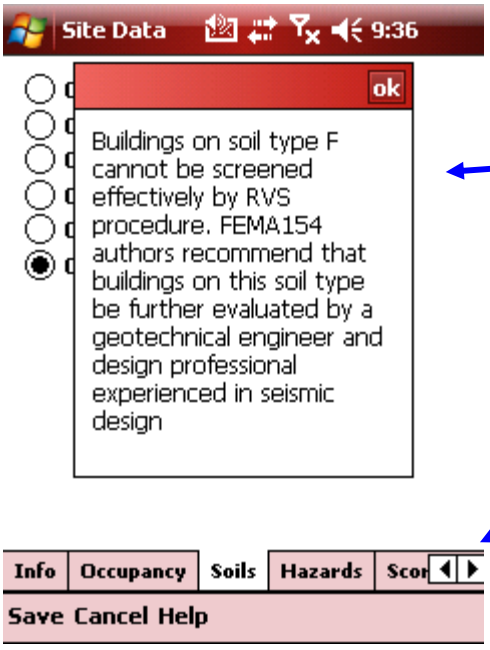
Step 4.

Tap on the **Occupancy** Tab and enter information



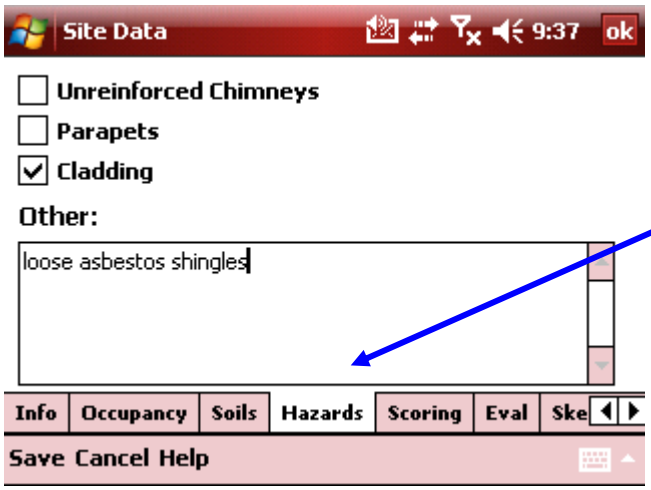
Step 5.

Tap on the **Soils** Tab and enter information, or as an option, the ROVER server can automatically estimate soil type upon synchronization.


Site Data
9:36
ok
Buildings on soil type F cannot be screened effectively by RVS procedure. FEMA154 authors recommend that buildings on this soil type be further evaluated by a geotechnical engineer and design professional experienced in seismic design
Info
Occupancy
Soils
Hazards
Scor
Save Cancel Help

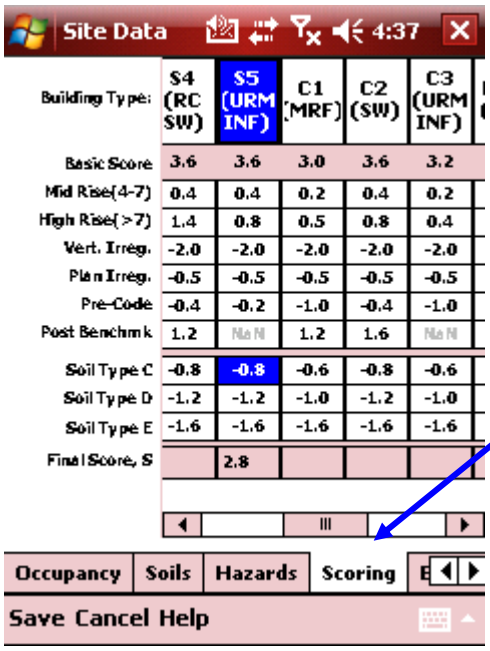
Note the alert for further evaluation if Class F Soil Type is chosen.

Note the left and right scroll arrows to advance to other tabs



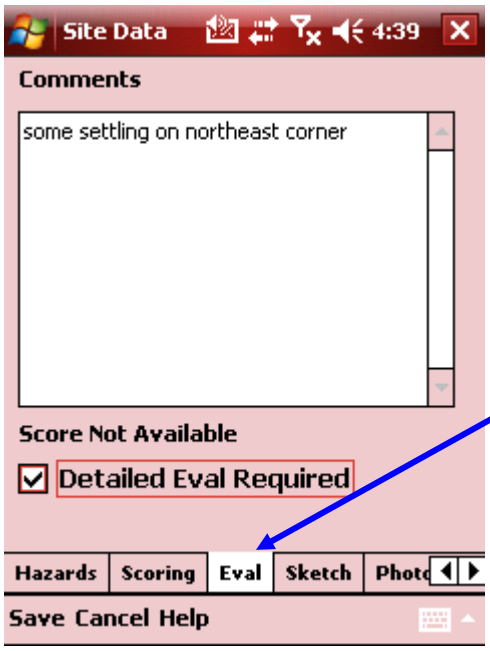
Step 6.

Tap on the **Hazards** tab and enter information.


Site Data
4:37
Building Type:
S4 (RC SW)
S5 (URM INF)
C1 (MRF)
C2 (SW)
C3 (URM INF)
Basic Score 3.6 3.6 3.0 3.6 3.2
Mid Rise(4-7) 0.4 0.4 0.2 0.4 0.2
High Rise(>7) 1.4 0.8 0.5 0.8 0.4
Vert. Irreg. -2.0 -2.0 -2.0 -2.0 -2.0
Plan Irreg. -0.5 -0.5 -0.5 -0.5 -0.5
Pre-Code -0.4 -0.2 -1.0 -0.4 -1.0
Post Benchmk 1.2 NaN 1.2 1.6 NaN
Soil Type C -0.8 -0.8 -0.6 -0.8 -0.6
Soil Type D -1.2 -1.2 -1.0 -1.2 -1.0
Soil Type E -1.6 -1.6 -1.6 -1.6 -1.6
Final Score, S 2.8
Occupancy
Soils
Hazards
Scoring
Save Cancel Help

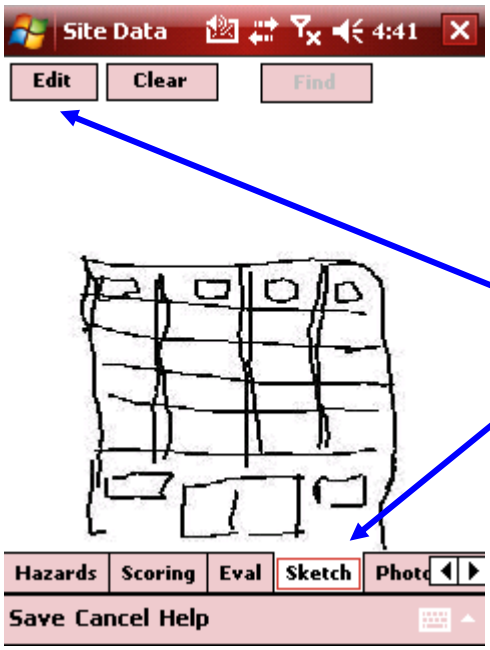
Step 7.

Tap on the **Scoring** tab and enter the building type by tapping on the category label, here, S5 (URM INF). Indicate whether any of the modifiers are present such as vertical or plan irregularity by tapping on the appropriate cell in the table. The score is calculated below. In ROVER, the score is not necessarily a simple sum of the basic score and modifiers; see Appendix A for an explanation.



Step 8.

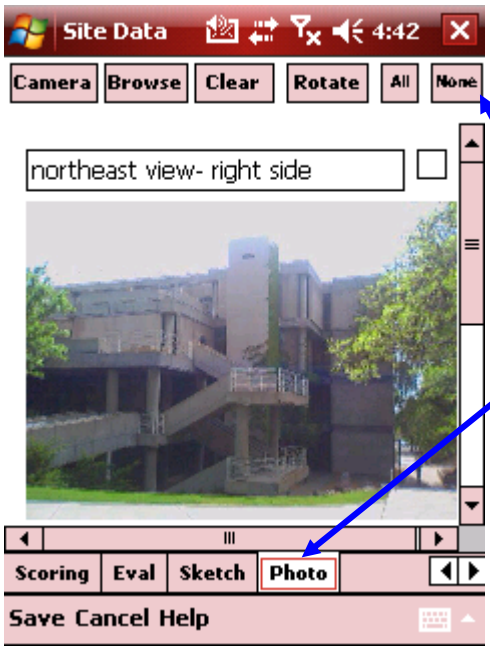
Tap on **Eval** (Evaluation) tab and enter information.



Step 9.

Tap on the **Sketch** tab and create a sketch using the stylus. (A sketch is important because it forces the user to walk around the building, if feasible.)

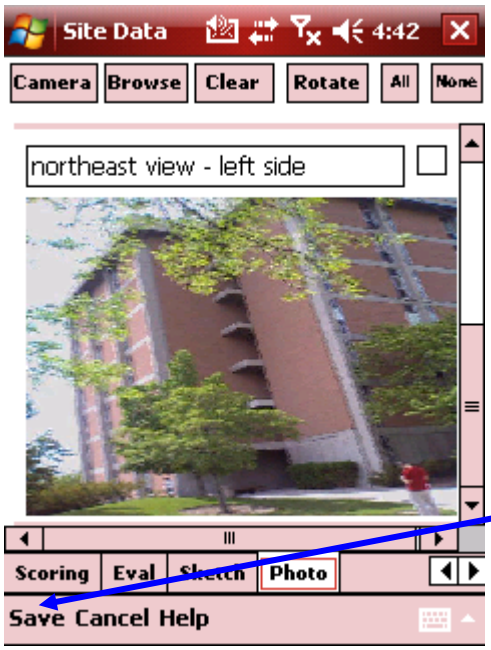
The **Edit** button allows the user to modify a previous sketch, while the **Clear** button allows the user to delete the sketch and create a new one.



Step 10.

Tap on the **Photo** Tab – tap on the following options:

- **Camera** takes photos of the structure. Two photos have been taken for this site
- **Browse** navigates to photos in the camera's photo gallery. Clicking on any photo will add it to the site's photo
- **Clear** deletes a photo after checking the box at the upper right corner of the photo
- **Rotate** rotates photo(s) counterclockwise after checking the box at the upper right corner of the photo
- **All** or **None** will check/uncheck all or none of the photos a comments field above the photo allows text to be input



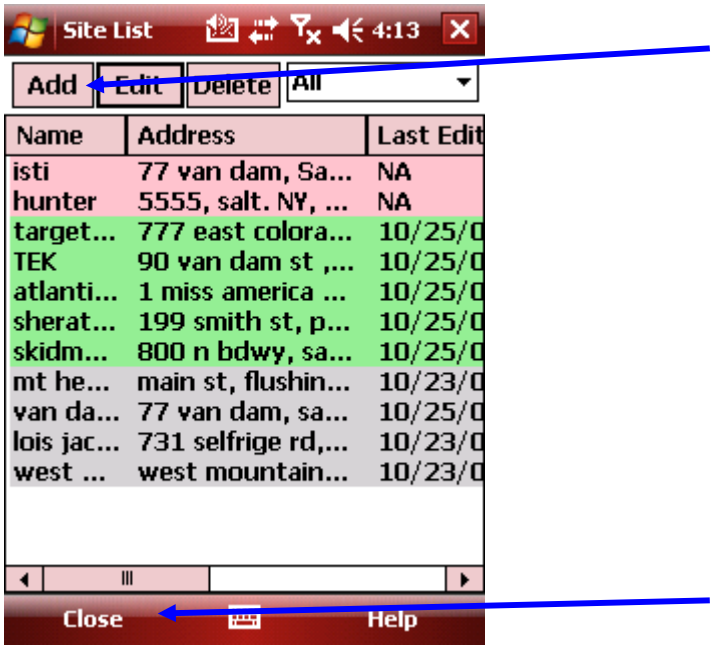
Step 11.

Tap on **Save** to save the data and go back to Pre-EQ. If you do not wish to save the edits, tap **Cancel.**

Note: ROVER does not distinguish between pre- and post-earthquake photos. The user can specify the type of photo through comments.

Note: Tapping **Cancel** will cause all changes in the tabs being modified to be lost. The inspection record will continue to exist in the database with the data **prior** to modification.

6.4.1.2 Pre-EQ Survey: Adding New Sites



Step 1.

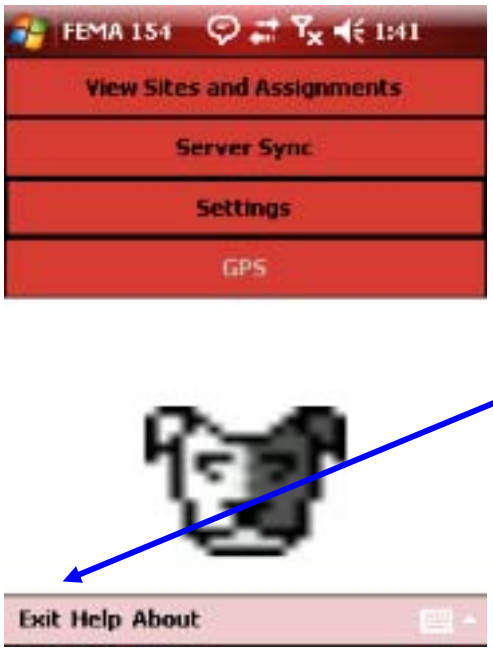
To add new sites, tap on the ***Add*** button.

Steps 2-11.

This will lead to the same set of tabs as the ***Edit*** option, but with empty fields. Enter data for each tab until site information is complete. Tap on **Save** to save and return to the **Site List** screen.

Step 12.

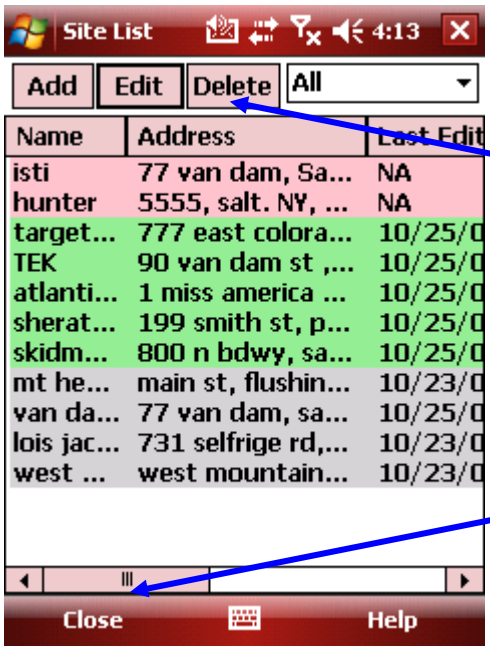
Once all information for a Pre-EQ Survey has been added or edited, tap on **Close.**



Step 13.

Tap on **Exit** to quit the application.

6.4.1.3 Pre-EQ Survey: Deleting Sites



Step 1.

To delete sites, tap on the site to highlight it and then on the ***Delete*** button.

Step 2.

Tap on **Close**.

This will return the user to the main menu.

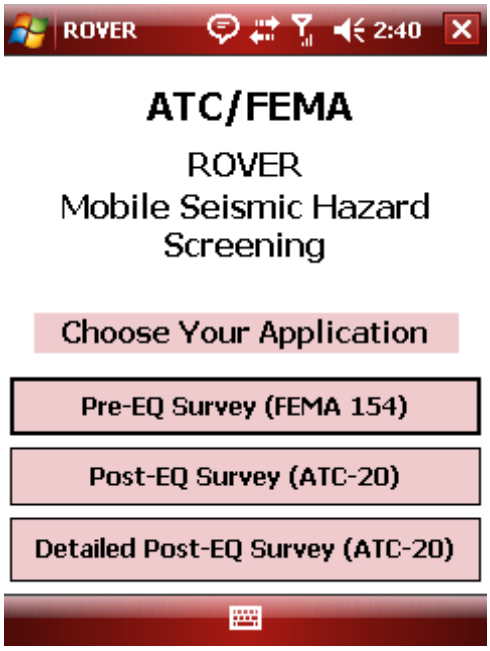
Note: Deleting a site on the smartphone will **NOT** delete the site on the server **IF** the site has been previously synced. Deleting sites on the server can be done with adminis-

trative privileges. Please refer to Section 9.3 for information on deleting sites on the server.

6.5 Post-earthquake Survey (ATC-20)

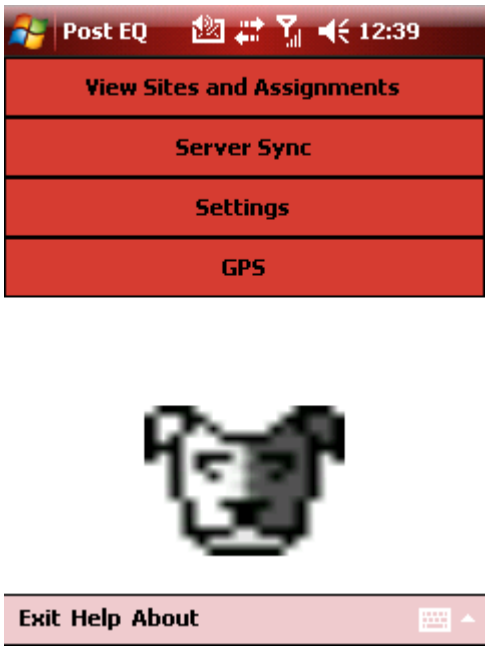
Conducting a post-earthquake evaluation on ROVER is analogous to conducting a survey using the paper versions of ATC-20. Since data common to pre-earthquake FEMA 154, post-earthquake and detailed post-earthquake surveys (ATC-20) may be already entered and are accessible by each module of ROVER, data-entry demands on the user are reduced along with the effort of connecting and reconciling pre- and post-earthquake data. This makes the ATC-20 process more efficient if pre-earthquake data have already been input and can help to improve the accuracy of future pre-earthquake safety evaluations, and vice versa.

6.5.1 The Post-Earthquake Survey - View Sites and Assignments



Step 1.

In the ROVER main menu tap on **Post-EQ Survey (ATC-20)**.



Step 1a.

If using a GPS device, follow the steps in **Section 6.3.2** to ensure communication between ROVER and the GPS.

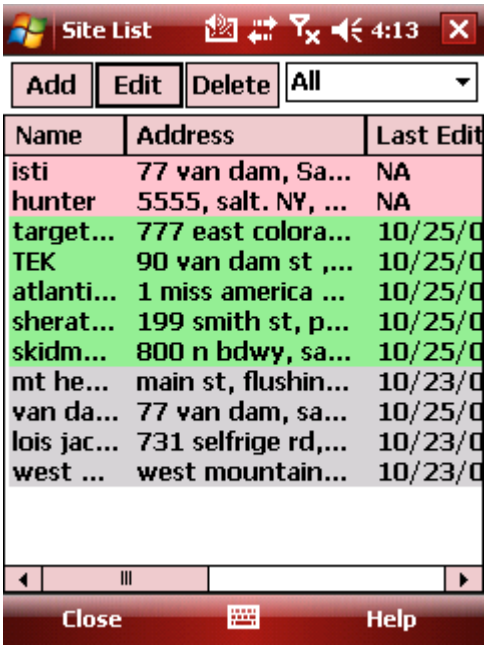
Step 2.

Tap on **View Sites and Assignments**.

6.5.1.1 Post-EQ Survey - Viewing/Editing Existing Sites

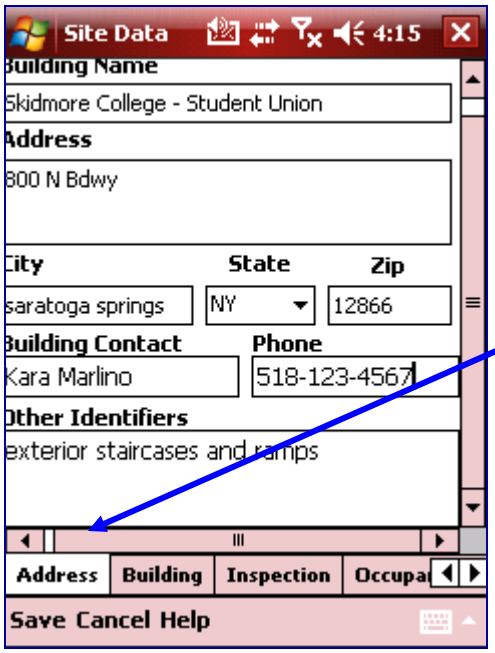
Note: The site **Skidmore College-Student Union** will be used throughout this example.

To edit an existing site, tap on the name of that site, which in the example is **skidmore college-student union,** and tap ***Edit***. This will navigate to the **Address** tab. The user can advance through the tabs and enter information similarly to the ATC-20 inspection form. When data entry is completed in the tab, the user can advance to other tabs by tapping on the tab, or using the forward and backward arrows.



Step 1.

Tap on a site name such as **skidmore college-student union** and then tap **Edit**.

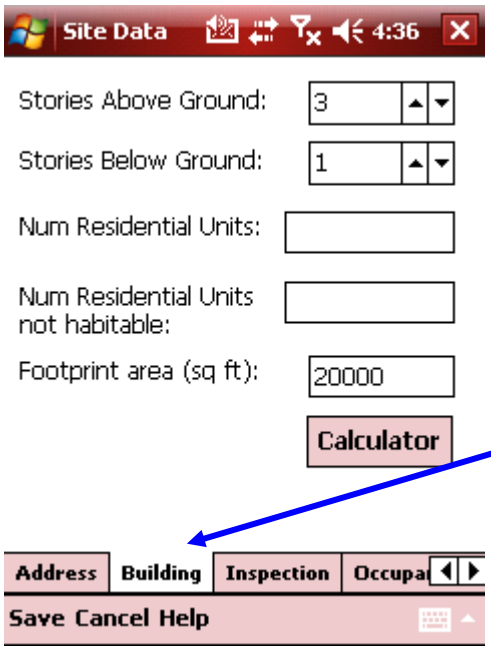


Step 2.

In the **Address** tab enter address information.

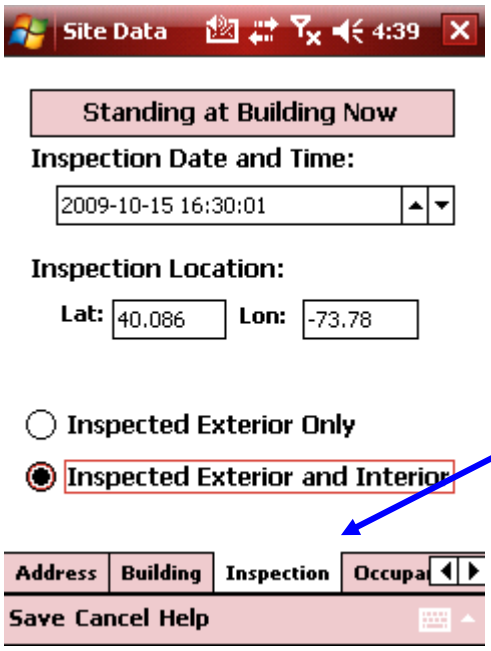
Note several edits that were made to the Post-EQ worksheet:

- **Building Name** and **Address** are now capitalized, whereas they were in small letters in the original entry
- **Building Contact** and **Phone** were added, whereas they were



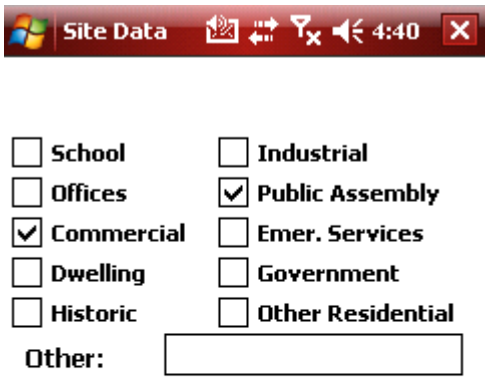
Step 3.

Enter information in the **Building** tab.



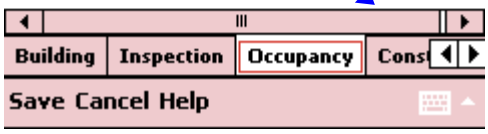
Step 4.

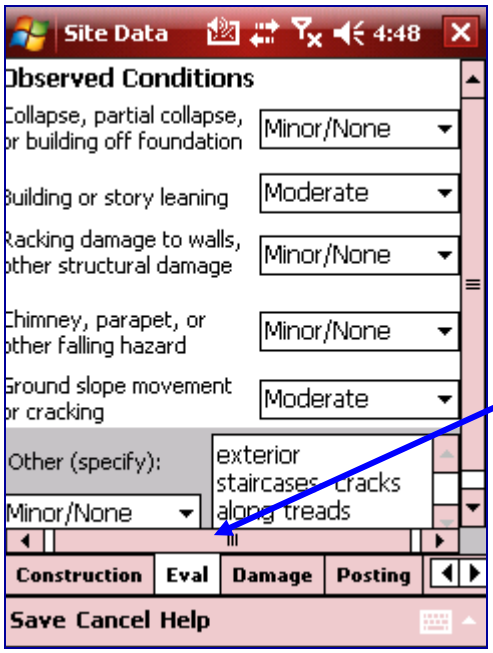
Enter information in the **Inspection** tab.



Step 5.

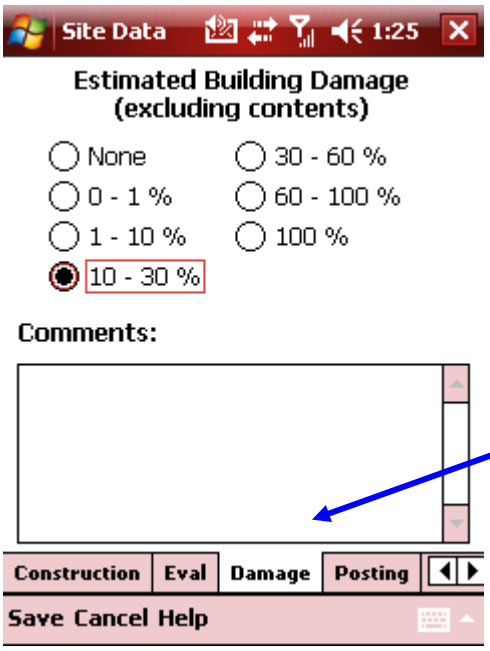
Enter information in the **Occupancy** tab.





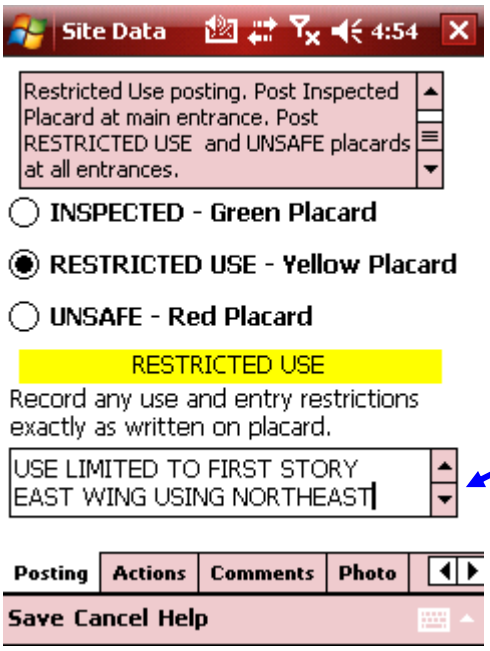
Step 6.

Enter information in the **Eval** tab.



Step 7.

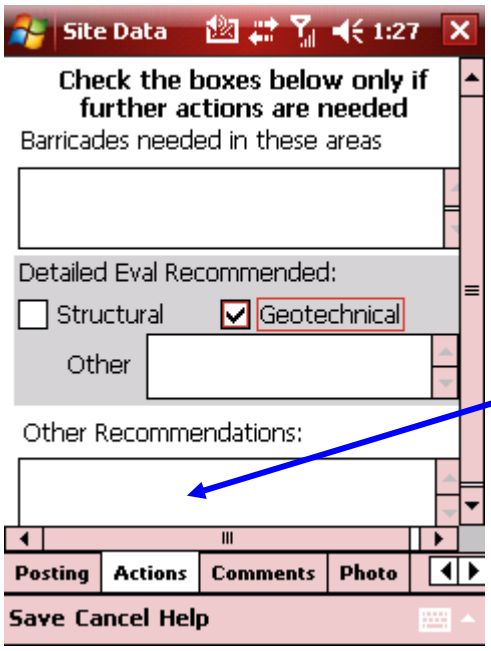
Enter information in the **Damage** tab.


Site Data
4:54
Restricted Use posting. Post Inspected Placard at main entrance. Post RESTRICTED USE and UNSAFE placards at all entrances.
INSPECTED - Green Placard
RESTRICTED USE - Yellow Placard
UNSAFE - Red Placard
RESTRICTED USE
Record any use and entry restrictions exactly as written on placard.
USE LIMITED TO FIRST STORY EAST WING USING NORTHEAST
Posting
Actions
Comments
Photo
Save Cancel Help

Step 8.

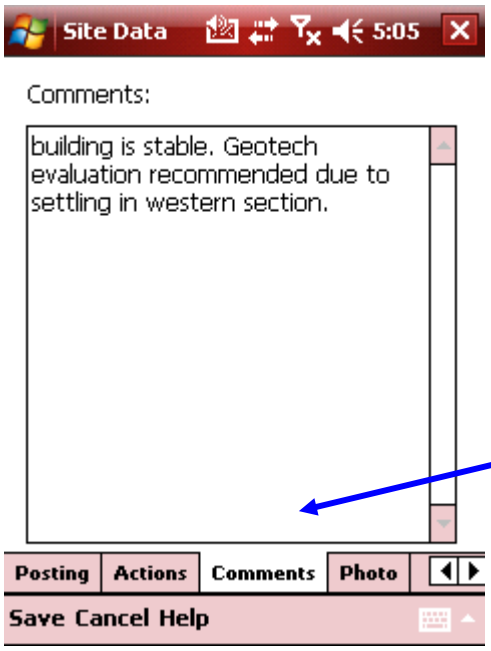
Enter information in the **Posting** tab.

Note the up/down scroll arrows that allow data entry and viewing beyond the visible portion on the screen.



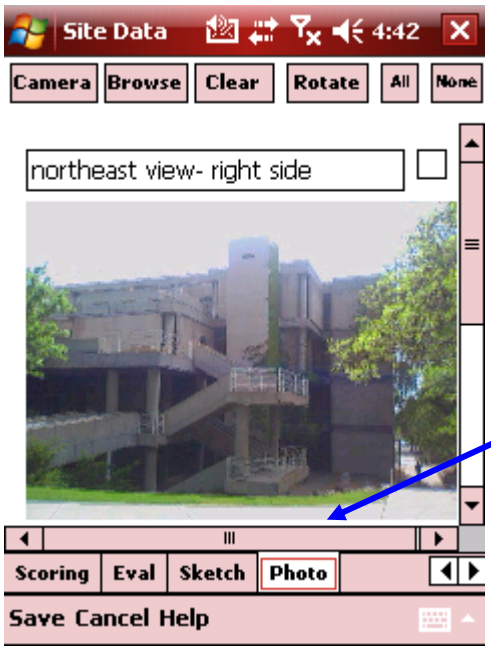
Step 9.

Enter the appropriate information in the **Actions** tab.



Step 10.

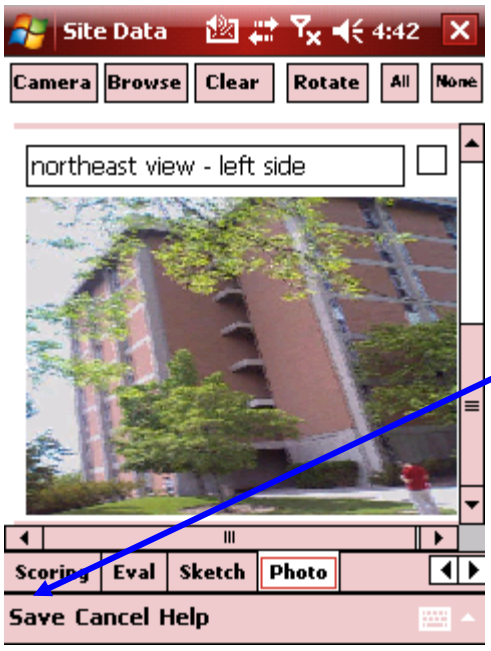
Enter any comments in the **Comments** tab.



Step 11.

Enter additional photos in the **Photo** tab.

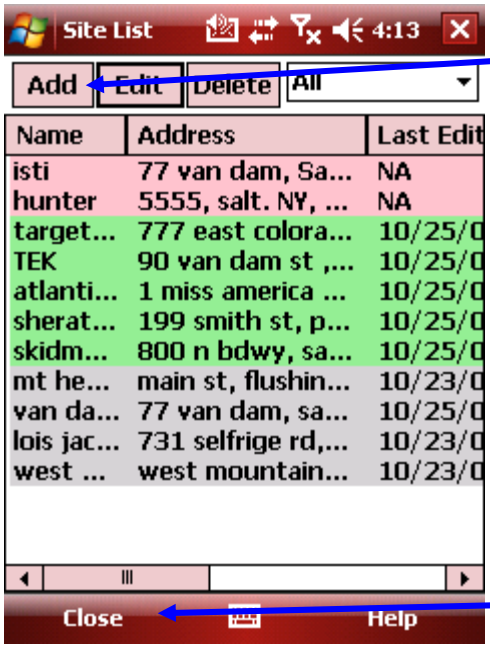
Note: ROVER does not distinguish between pre- and post-earthquake photos. The user can specify the type of photo through comments.



Step 12.

Tap **Save** when done.

6.5.1.2 Post-EQ Survey: Adding New Sites



Step 1.

To add new sites, tap on the ***Add*** button.

Steps 2-11.

This will lead to the same set of tabs as the ***Edit*** option, but with empty fields. Enter data for each tab until site information is complete. Tap on **Save** to save and return to the **Site List** screen.

Step 12.

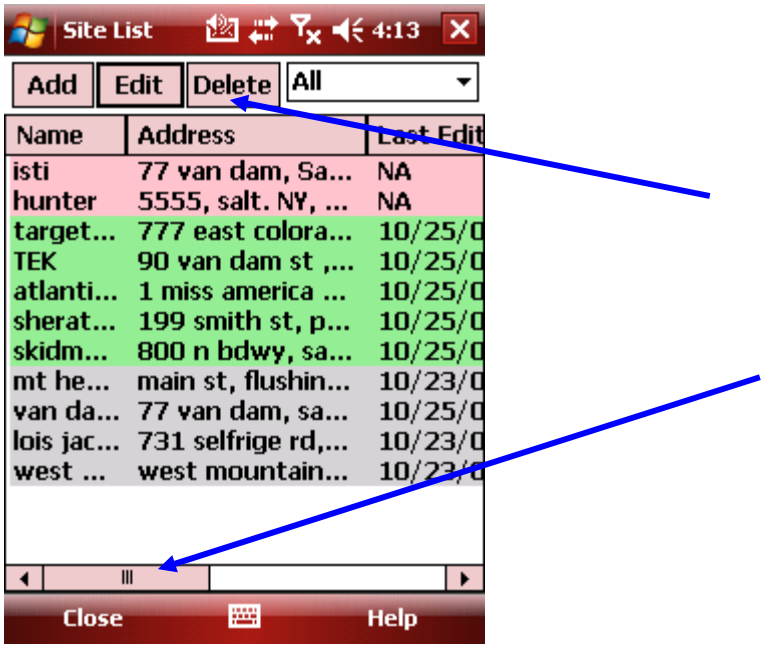
Once all information for a Post-EQ Survey has been added or edited, tap on **Close.**

This will return the user to the startup

Step 13.

Tap on **Exit** to quit the application.

6.5.1.3 Post-EQ Survey: Deleting Sites



Step 1.

To delete sites, tap on the site and then on the ***Delete*** button.

Step 2.

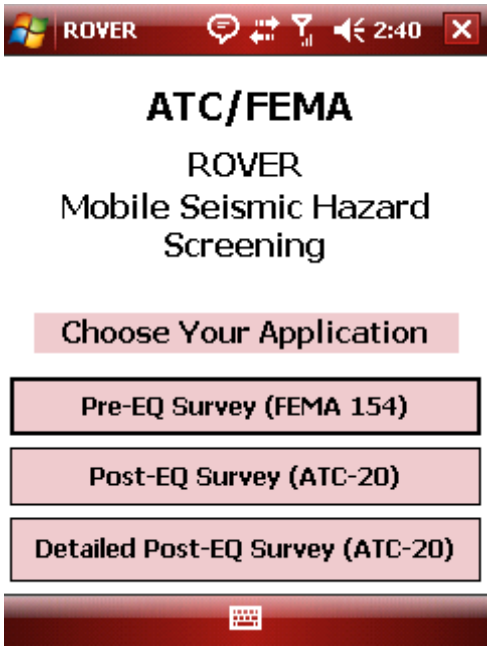
Tap on **Close.** This will return the user to the main menu.

Note: Deleting a site on the smartphone will **NOT** delete the site on the server **IF** the site has been previously synced. Deleting sites on the server can be done with administrative privileges. Please refer to Section 9.3 for information on deleting sites on the server.

6.6 Detailed Post-Earthquake Survey (ATC-20)

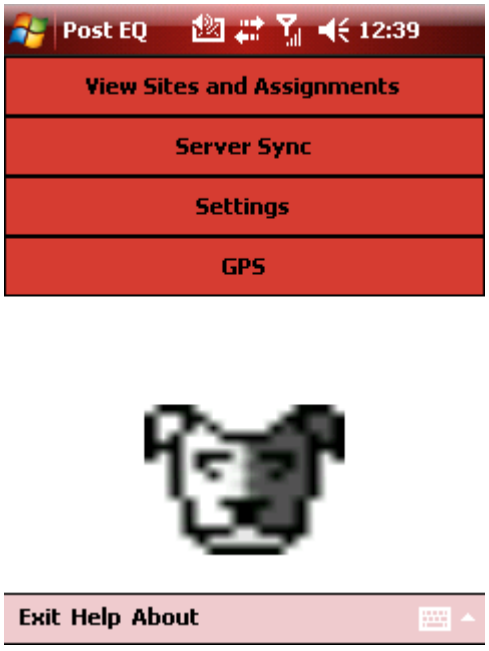
Conducting a detailed post-earthquake evaluation on ROVER is analogous to conducting a survey using the two page detailed evaluation form of ATC-20. Any data previously entered for this building using the pre-earthquake FEMA 154 form, the post-earthquake ATC-20 rapid evaluation form, or previous detailed evaluations will already be shown on the detailed evaluation form. Data-entry demands on the user are reduced to that extent, making the ATC-20 process more efficient and potentially more accurate for future pre- and post-earthquake safety evaluations.

6.6.1 The Detailed Post-Earthquake Survey: View Sites and Assignments



Step 1.

In the ROVER main menu tap on **Detailed Post-EQ Survey (ATC-20)**.



Step 1a.

If using a GPS device, follow the steps in **Section 6.3.2** to ensure communication between ROVER and the GPS.

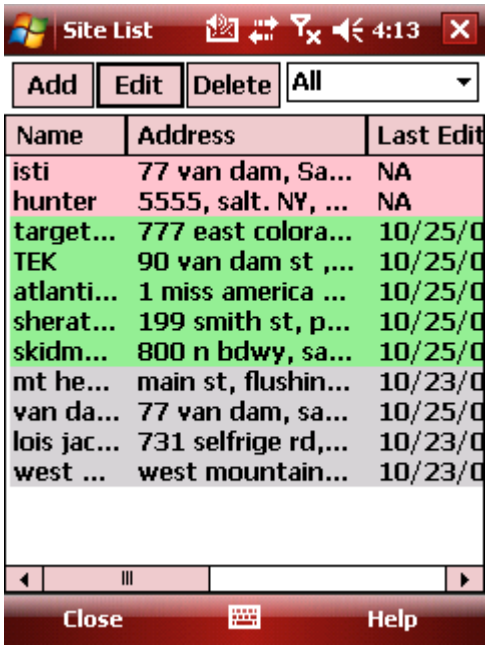
Step 2.

Tap on **View Sites and Assignments**.

6.6.1.1 Detailed Post-EQ Survey: Viewing/Editing Existing Sites

Note: The site **Skidmore College-Student Union** will be used throughout this example.

To edit existing sites, tap on the name of the existing site which in this example is **Skidmore College-Student Union**. This highlights the record; now tap ***Edit***. This will open an **Address** tab. The user can advance to other tabs by tapping on the tab or using the forward and backward arrows.

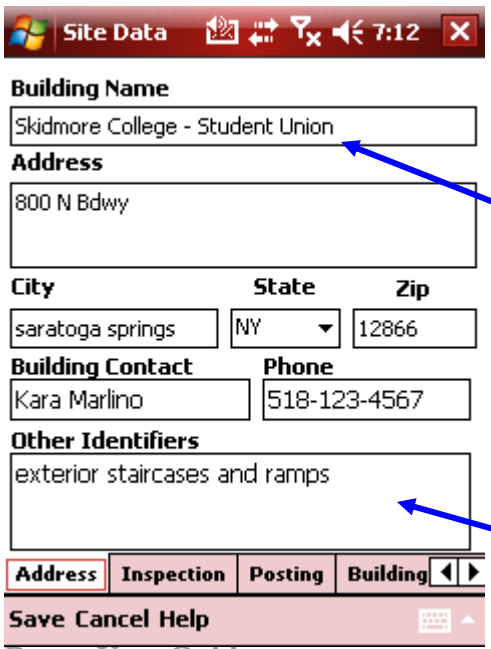


Step 1.

Tap on skidmore college-student union and tap **Edit**.

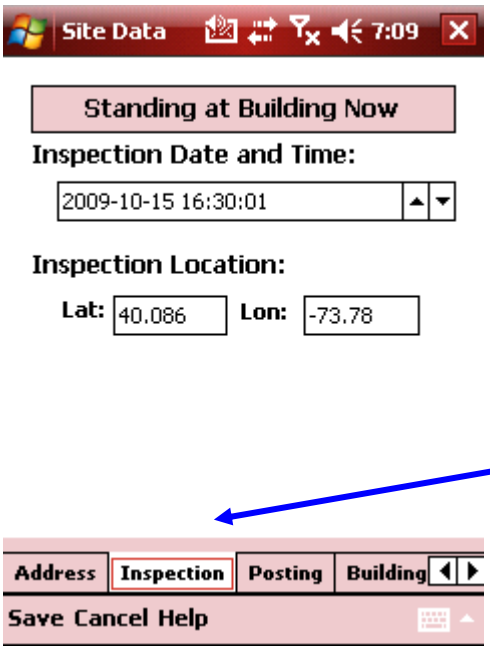
Step 2.

In the **Address** Tab enter address information.



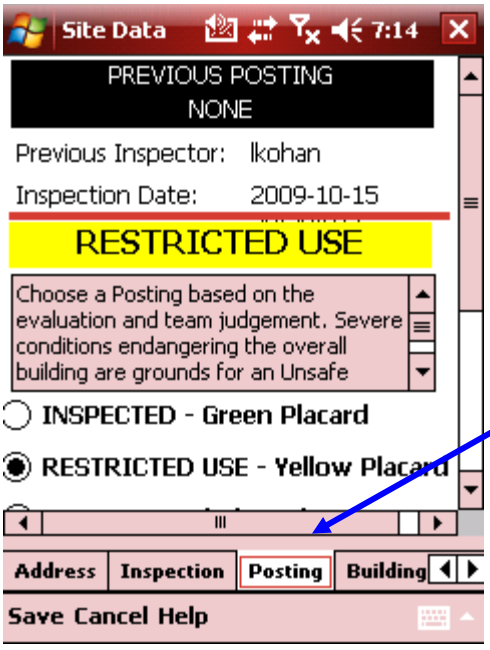
Note that edits that were made to the **Post-EQ** worksheet have been saved to the **Detailed Post-EQ** worksheet:

- **Building Name** and **Address** are now capitalized, whereas they were in small print in the original entry
- **Building Contact** and **Phone** were added, whereas the data was missing previously
- **Other identifiers** were modified



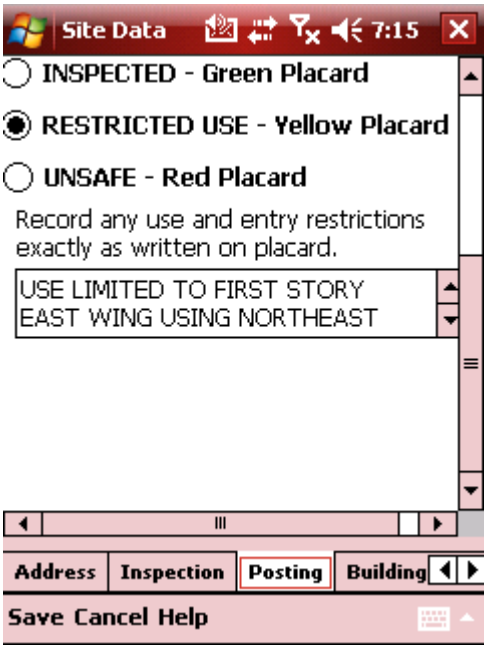
Step 3.

Enter information in the **Inspection** tab.

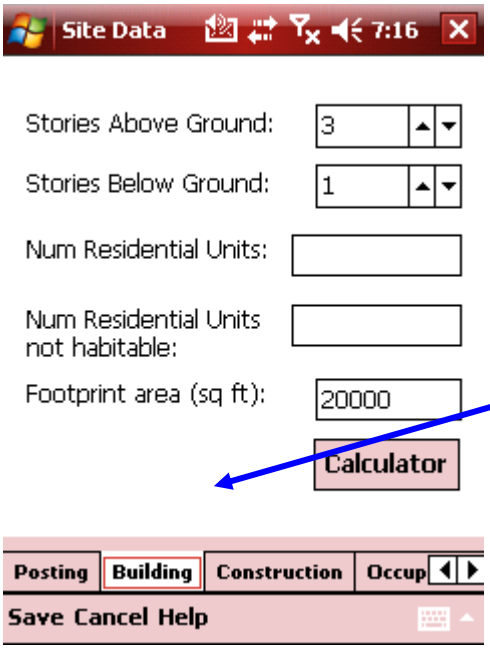


Step 4.

Enter information in the **Posting** tab. Note that more information can be input by scrolling down the screen.

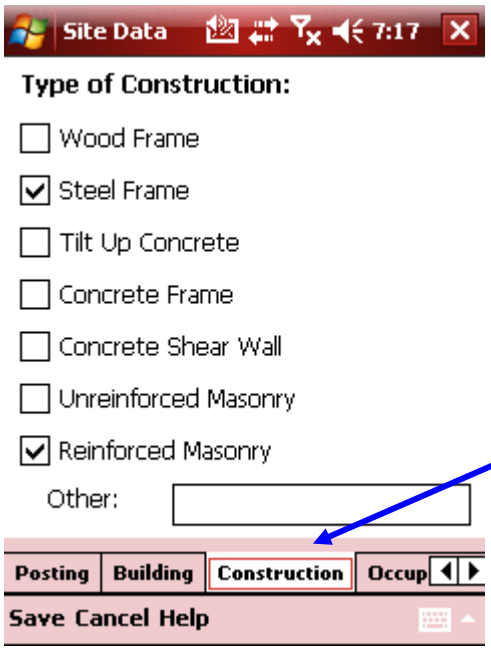


The user can scroll up or down in the **Posting** tab to enter/view required information.



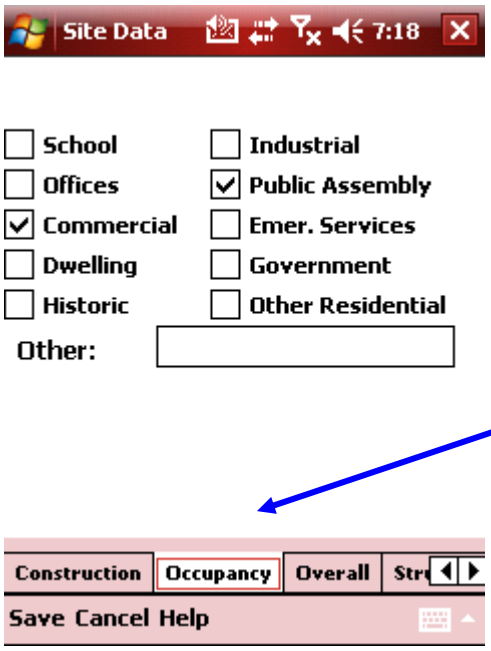
Step 5.

Enter information in the **Building** tab.



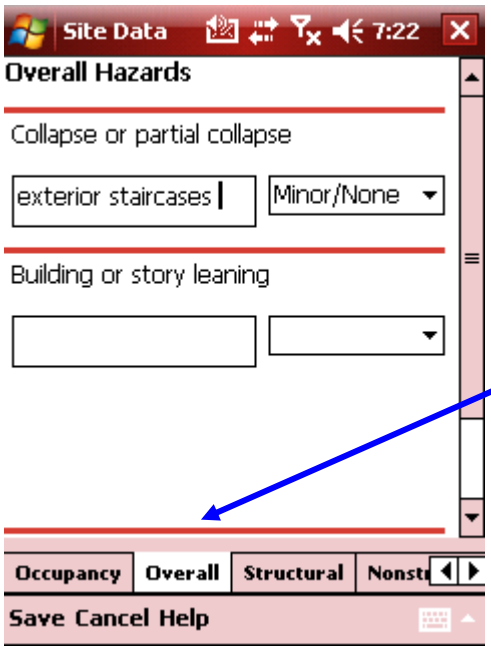
Step 6.

Enter information in the **Construction** tab.



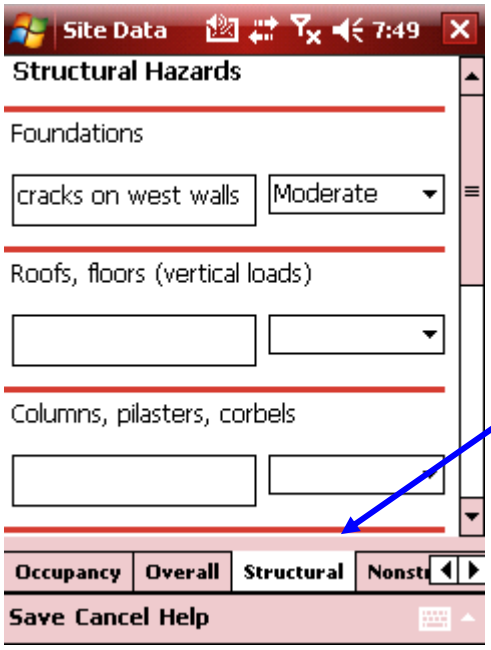
Step 7.

Enter information in the **Occupancy** tab.



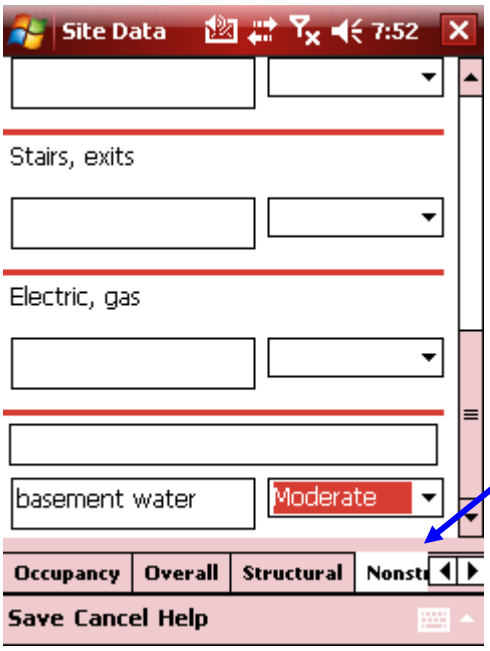
Step 8.

Enter information in the **Overall** tab.



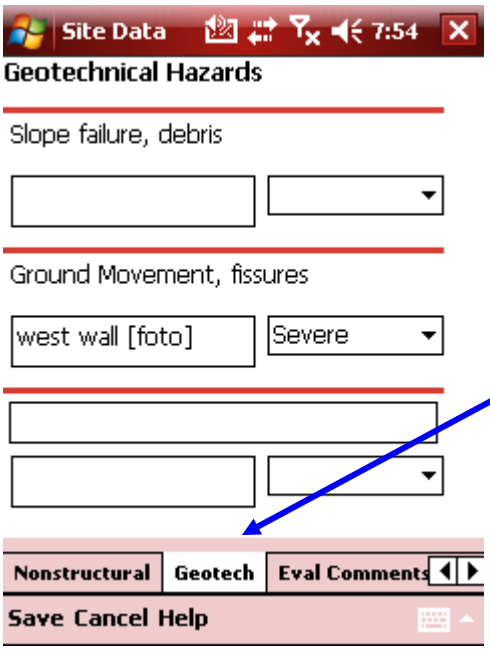
Step 9.

Enter information in the **Structural** tab. Use the scroll bar to move up or down in the worksheet.



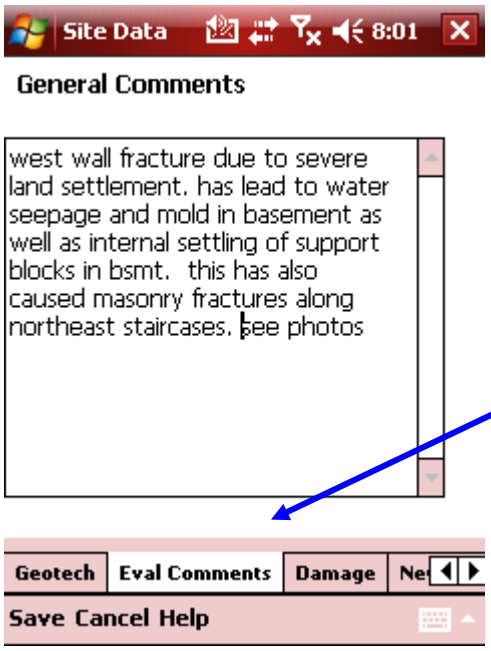
Step 10.

Enter information in the **Nonstructural** tab. Use the scroll bar to move up or down in the worksheet. Also note the right/left arrows at the bottom right of the screen allowing the user to move to the next tabs.



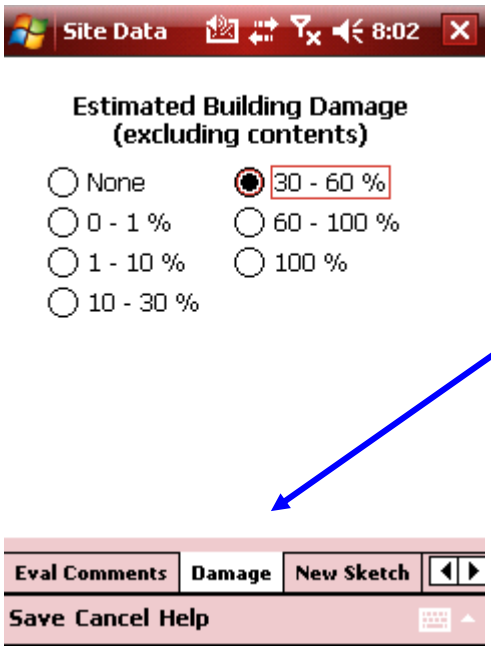
Step 11.

Enter information in the **Geotech** tab.


Site Data
8:01
General Comments
west wall fracture due to severe land settlement. has lead to water seepage and mold in basement as well as internal settling of support blocks in bsmt. this has also caused masonry fractures along northeast staircases. see photos
Geotech
Eval Comments
Damage
Save Cancel Help

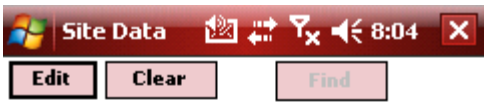
Step 12.

Enter information in the **Eval Comments** tab. Use the scroll bar to move up or down in the worksheet.



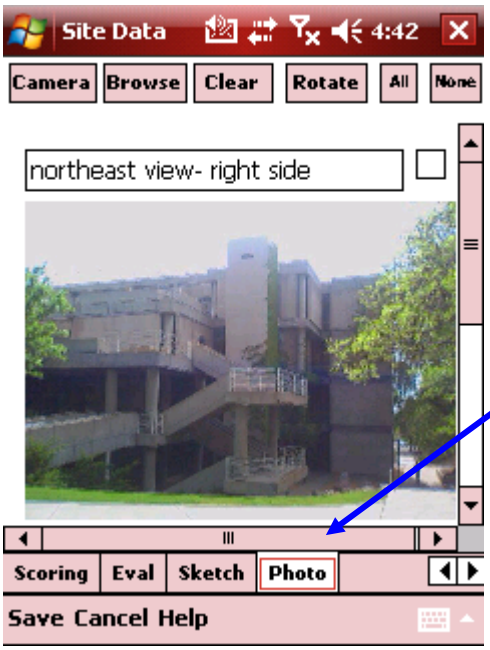
Step 13.

Enter information in the **Damage** tab.



Step 14.

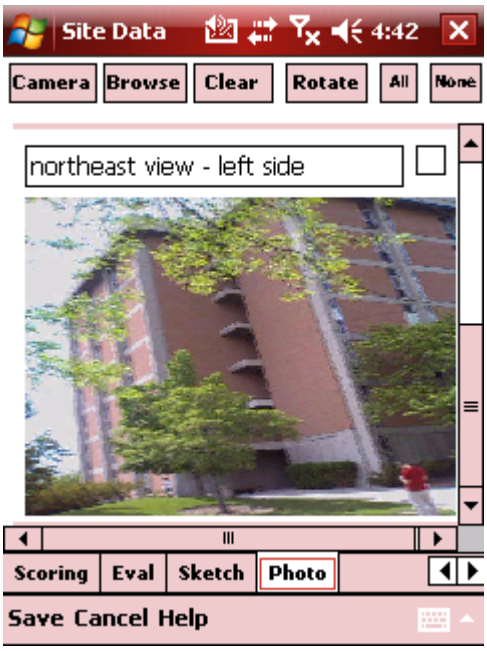
Enter a sketch in the **New Sketch** tab.



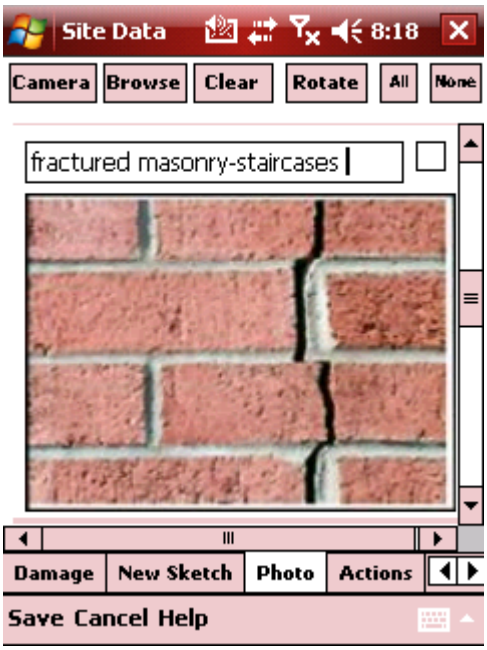
Step 15.

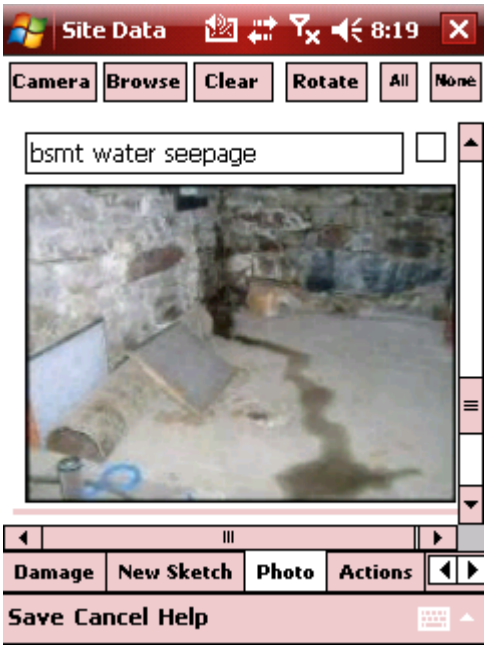
Enter new photos in the **Photo** tab. Enter text in the comments field.

Note: ROVER does not distinguish between pre- and post-earthquake photos. The user can specify the type of photo through comments.



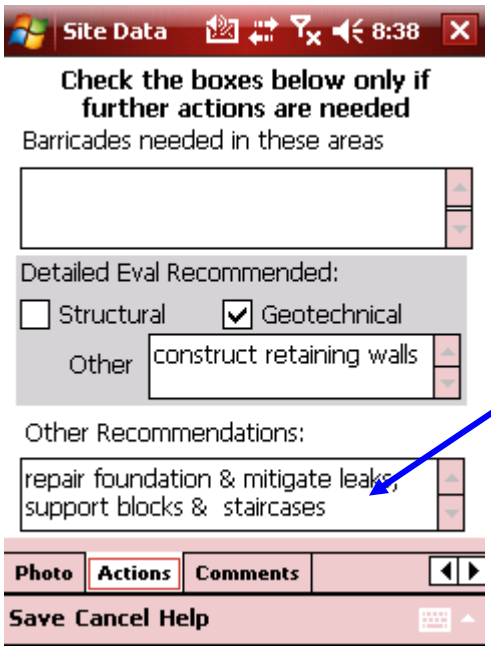
More exterior photos of the same building in the example above detailing exterior damages.





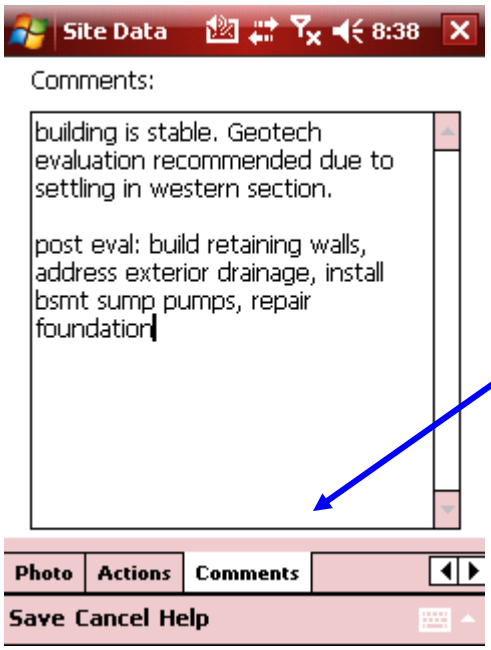
Interior photos of the same building in example above detailing damage to the basement and foundation.

Note that sketches and photos of each site are grouped together per building.



Step 16.

Enter information in the **Actions** tab. Use the scroll bar to move up or down in the worksheet.


Site Data
8:38
Comments:
building is stable. Geotech evaluation recommended due to settling in western section.
post eval: build retaining walls, address exterior drainage, install bsmt sump pumps, repair foundation
Photo
Actions
Comments
Save Cancel Help

Step 17.

Enter information in the **Comments** tab.

6.6.1.2 Post-EQ Survey: Adding New Sites

Step 1.

To add new sites, tap on the ***Add*** button.

Steps 2-17.

This will lead to the same set of tabs as the ***Edit*** option, but with empty fields. Enter data for each tab until site information is complete. Click on **Save** and return to the **Site List** screen.

Step 18.

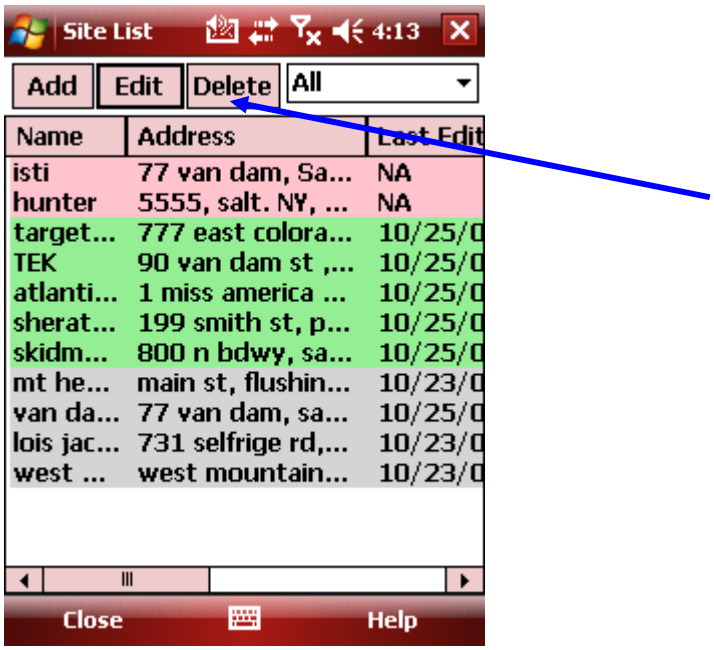
Once all information for the Detailed Post-EQ Survey has been added or edited, tap on **Close.**

This will return the user to the main menu.

Step 19.

Tap on **Exit** to quit the application.

6.6.1.3 Post-EQ Survey: Deleting Sites



Step 1.

To delete sites, tap on the site and then on the ***Delete*** button.

Step 2.

Tap on **Close** and return to the main menu.

Note: Deleting a site on the smartphone will **NOT** delete the site on the server **IF** the site has been previously synced. Deleting sites on the server can be done with administrative privileges. Please refer to Section 9.3 for information on deleting sites on the server.

7 Using the GPS Device with ROVER

7.1 Introduction

ROVER requires the latitude (lat), longitude (lon) and timestamp (coordinated universal time, or UTC) of the inspected location. There are a few ways that this information can be obtained:

1. The ROVER software suite has the ability to interface with a Bluetooth-enabled GPS device to retrieve the latitude, longitude and timestamp of the GPS during an inspection. This is accomplished by establishing communication between the smartphone and the GPS device and prompting ROVER to record the GPS location and time in the **Address** tab for the site.

2. The latitude/longitude information can be manually input by the user in the "lat", "lon" fields in the Address tab. This information can usually be obtained through Google Earth or various other search engines by inputting the address of the site, or by carrying a standard (non-Bluetooth) GPS device that displays latitude and longitude on screen.

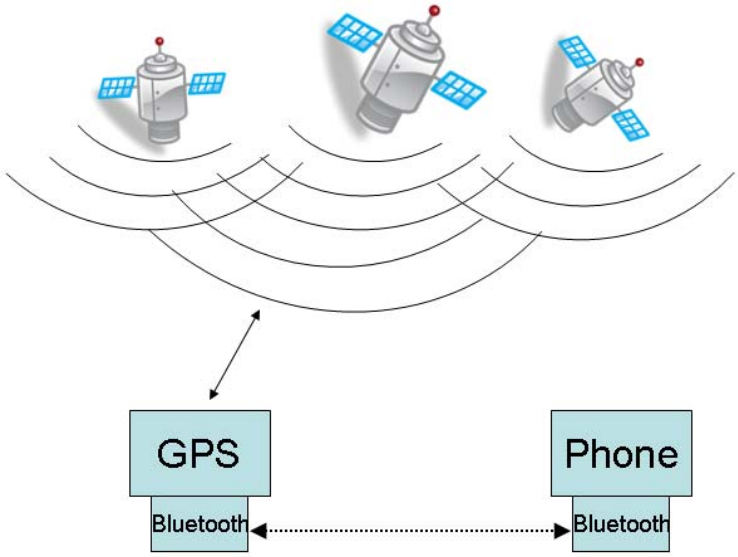
3. The latitude/longitude information can be obtained from a non-Bluetooth GPS device through its track log information and merged into the ***Site Address*** tab by using the ROVER **Merge Field Data** function from the Server. It is important that the user have the GPS active and logging during the inspection of the building and within a time span that is fairly close to the time of the inspection. Common GPS devices can record locations every 30 seconds for a full workday. Using this method requires that the smartphone and GPS devices be set to the same time zone. (See the devices' user's manuals for instructions on how to do this.) The GPS location is obtained and merged to the database by matching the closest time stamp from the GPS track log to the time stamp assigned when clicking the **Standing at Front Door** in the **Address** tab. Please refer to the **Merge Field Data** function in **Chapter 7 Instructions for Using ROVER Server**.

7.2 GPS and Bluetooth Primer

A Global Positioning System (GPS) device obtains a latitude and longitude for its position at any site and operates independently of the WM5+ phone or any other device. Once a GPS is turned on it uses a triangulation method to determine its location from three satellites. This knowledge of the location is independent of where the information is transferred to. In some cases, a GPS device can have a track log (internal) that keeps a record of its location and time. The frequency that this log is updated is manufacturer dependent and may be set by the user to control memory and system resources. For example, recording a timestamp, latitude and longitude every five seconds for a unit that will remain at the same site for hours at a time may be a waste of resources and battery life (typically 10 hours on a single charge).

This may fill up the unit's storage capacity, especially, if the user intends to use the GPS for several sites and hours. It is typically sufficient to record location every 30 seconds or so.

Bluetooth is a short range wireless connectivity standard with a typical range of 20 feet. One can envision a Bluetooth connection as an invisible cable connecting two devices, the phone and the GPS device in this case. If either end is disconnected, communication between the two devices is interrupted or stopped. In regards to ROVER, a communication must be set up between the Bluetooth-enabled GPS device and ROVER by activating Bluetooth through the phone's **Settings** option. Once another Bluetooth device is detected (the GPS) and added as a new device (using the appropriate password of the GPS device), a serial port on the phone will be assigned by the user to communicate with the GPS device.



7.3 Operating the GPS Device

Please follow the instructions in the user's manual of the GPS device for operation. The user must be familiar with the indicator lights of the GPS and what the different modes of flashing or steady LED lights signify.

As a demonstration, the Deluo Bluetooth-enabled GPS device (Deluo GPS) will be discussed. When the Deluo GPS is turned on from the side button, both a green and a blue light will flash continuously. This flashing indicates that the device is attempting to identify its position and also communicate with another Bluetooth device. When the GPS has obtained its position, the flashing green light will become solid green. The blue light will continue to flash until the communication protocol has been established with a phone, at which time the blue light will become solid. It is recommended that this procedure be initiated early and the Bluetooth communication set up in tandem since the GPS device may take several minutes to acquire its position.

Tip: *It is recommended that the GPS remain on throughout the duration of the building inspection. This will keep the timestamps between the two devices in sync or approximately close, and will facilitate re-connection should the GPS temporarily lose its connectivity.*

7.4 Smartphone and GPS Device Communications via Bluetooth

7.4.1 Configuring Smartphone and GPS Communication Via Bluetooth

Establishing communications between a smartphone and a Bluetooth-enabled GPS device requires the smartphone to first detect the GPS via Bluetooth. Once detected by the phone, the two devices can communicate by a designated communication port (COM port) to each other. A smartphone can have several COM ports for various devices such as printers, other instruments, etc. Once a port is assigned to a device, only that device can be used for the port (unless the user deletes the device from the COM port and assigns a new device).

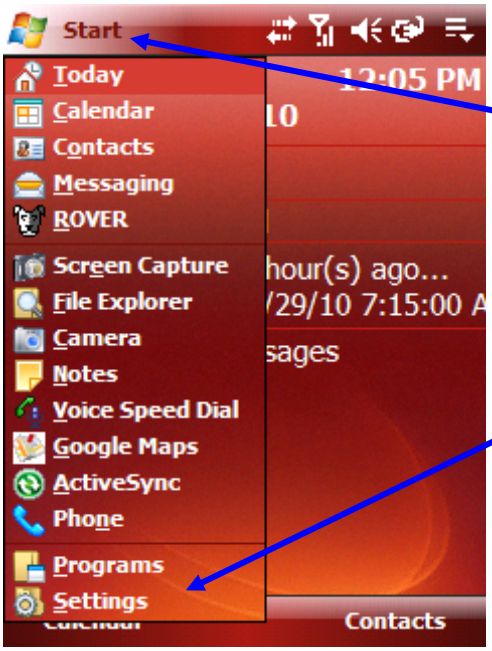
A smartphone and GPS device must communicate via a Bluetooth connection for ROVER to record the position of the location identified by the GPS device. The setup for configuring the two devices and assigning ROVER to communicate with the GPS device is described below:

.

Step 1.

Turn on the Bluetooth-enabled GPS device.

On the left are examples of 2 different Bluetooth GPS devices.

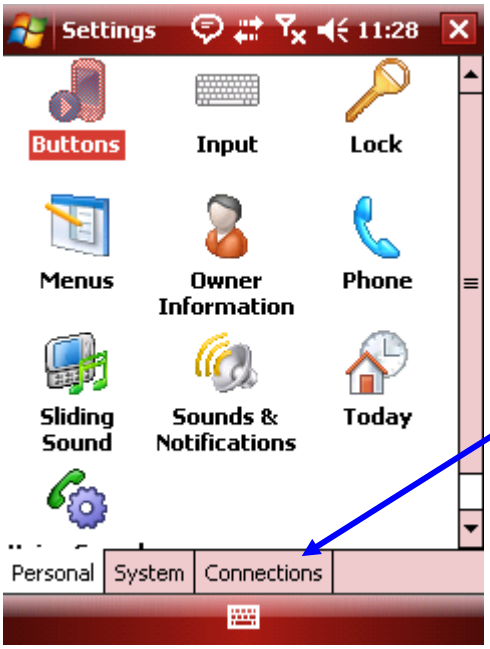


Step 2.

Tap on **Start** at the top left of the screen.

Step 3.

Select **Settings** toward the bottom of the menu.

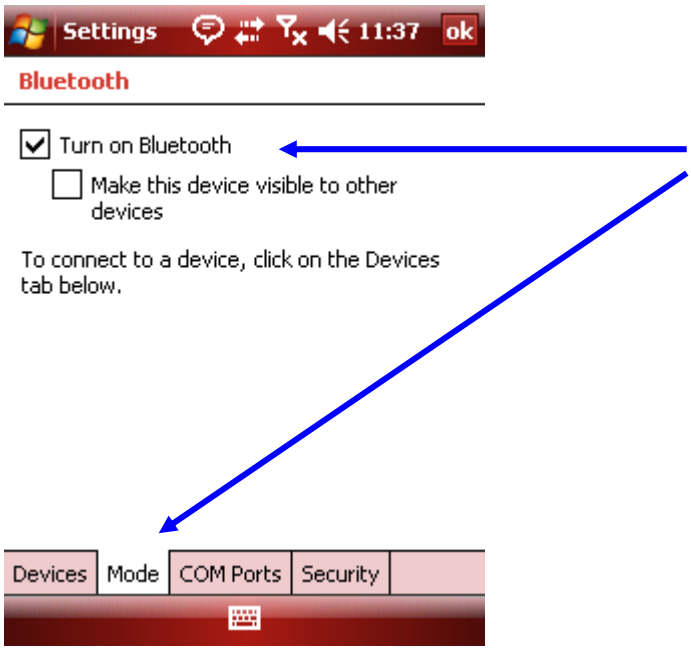


Step 4.

Tap on the **Connections** tab.

Step 5.

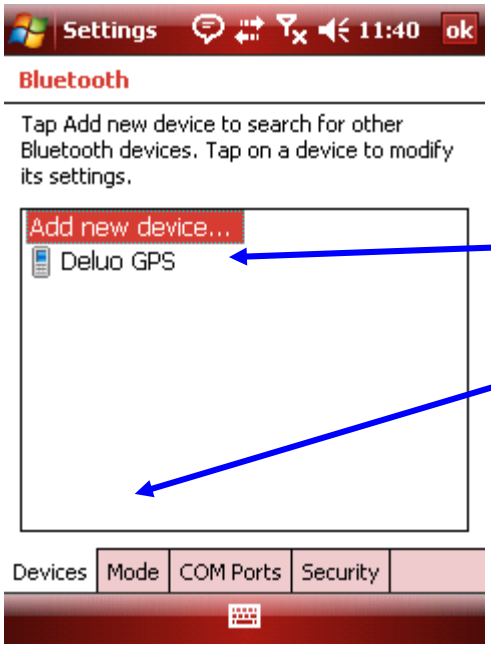
Tap **Bluetooth**.



Step 6.

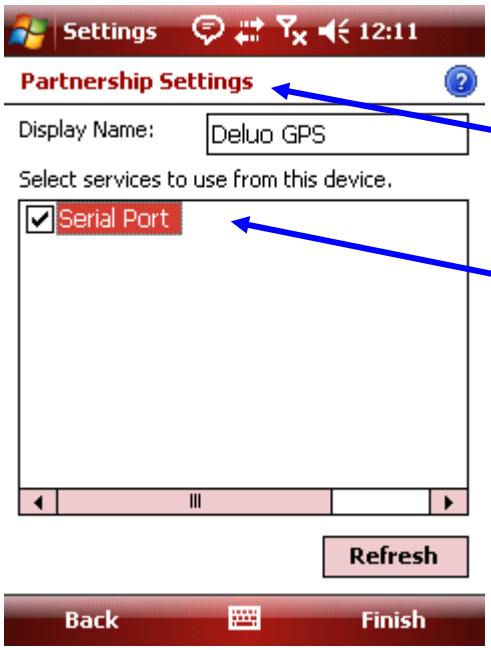
Tap on the **Mode** tab and tap on the **Turn on Bluetooth** checkbox.

7.4.1.1 If the GPS Device is already listed as an Option:



Step 7a.

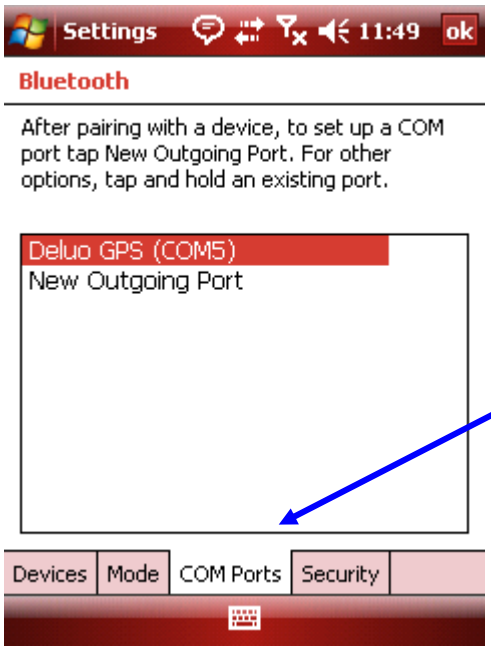
Go to the **Devices** tab and if the **GPS** device is listed, tap on it. Otherwise, tap on **Add new device** and follow **Steps 7b-14b.**



Step 8a.

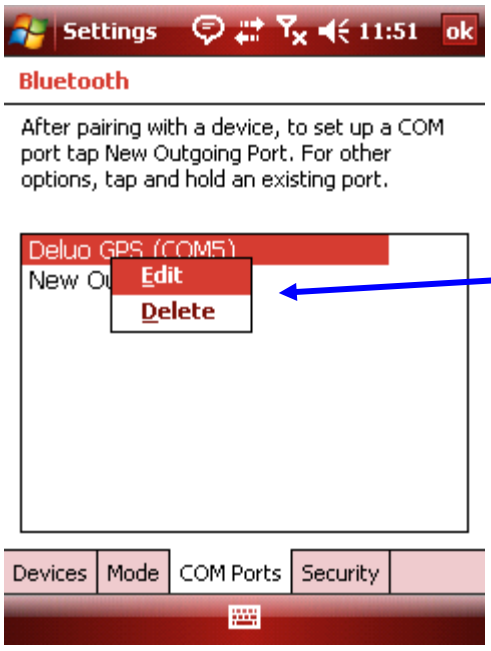
In this example, the Deluo GPS device will be chosen. This will display the **Partnership Settings**.

Tap **Serial Port** to check the box and tap **Finish (or Save)** on lower right corner.



Step 9a.

Go to **COM Ports** tab.



Step 10a.

Tap and hold the stylus on the **Deluo GPS (Com5)** option till the **Edit/Delete** option appears.

Tap on **Edit**.

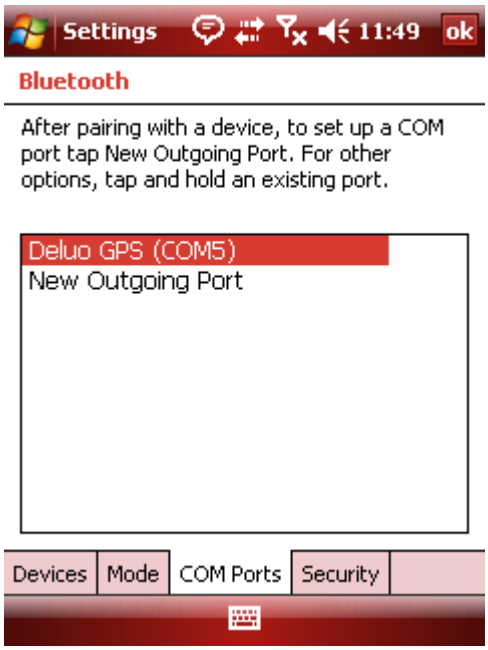
Step 11a.

Assign a port on the phone for the GPS connection. Typically, Ports COM4, COM5, and COM6 work best.

Step 12a.

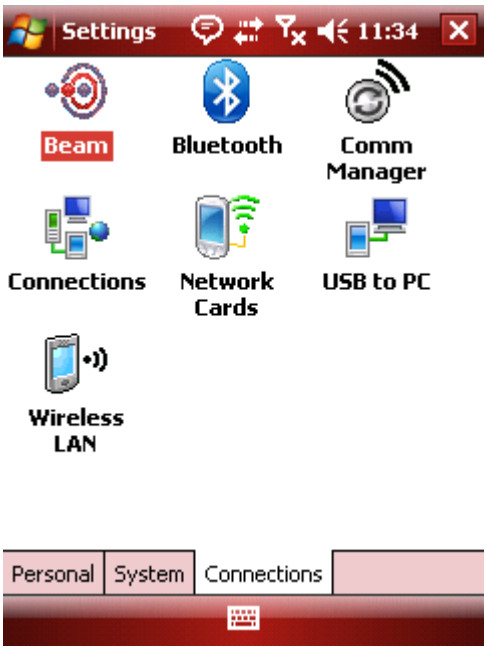
Tap the **Secure Connection** checkbox, so that it is checked.

Tap **Finish** on the lower right corner.



Step 13a.

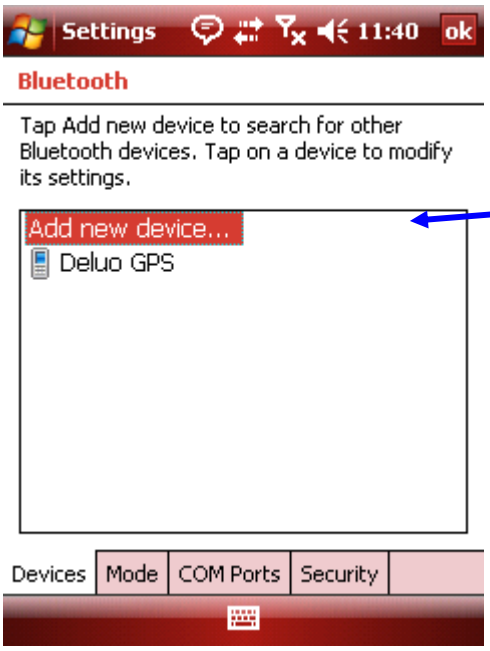
Tap **ok** on the upper right corner.



Step 14a.

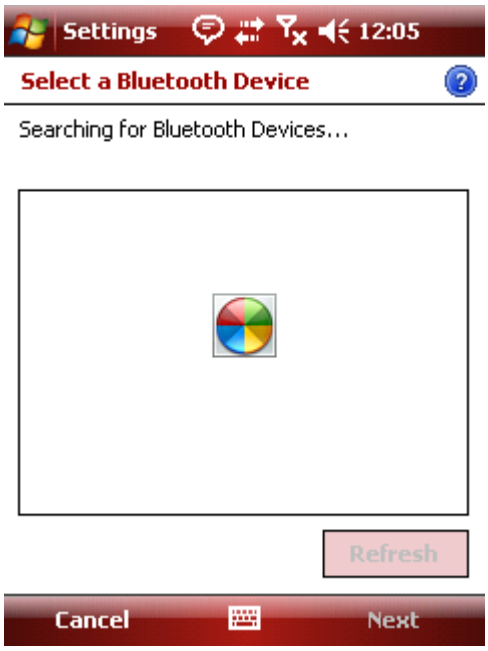
This leads back to the **Connections** tab. Tap **X** on the top right to exit the **Settings** window.

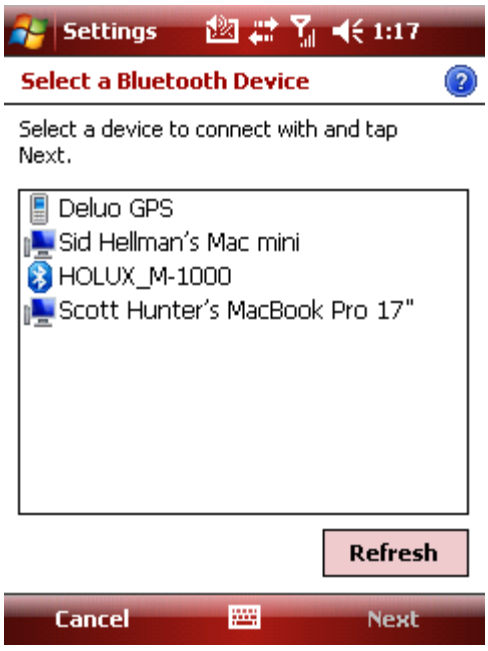
7.4.1.2 If the GPS Device is NOT Listed as an Option:



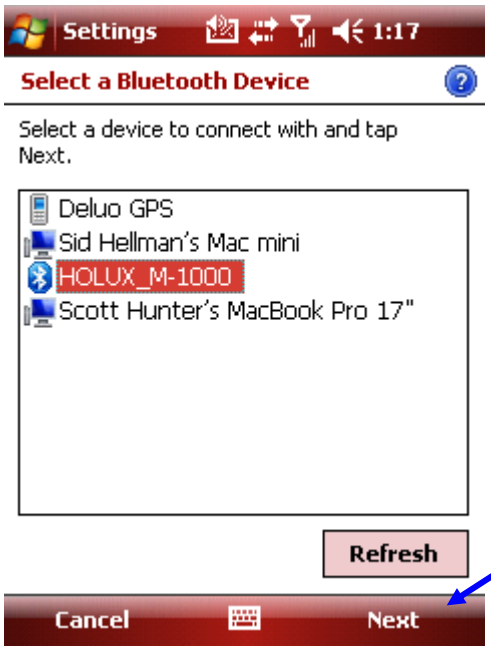
Step 7b.

Tap on **Add new device**.





After a few moments, Bluetooth devices will be detected and listed. The Holux_M-1000 GPS will be selected for pairing with the smartphone.



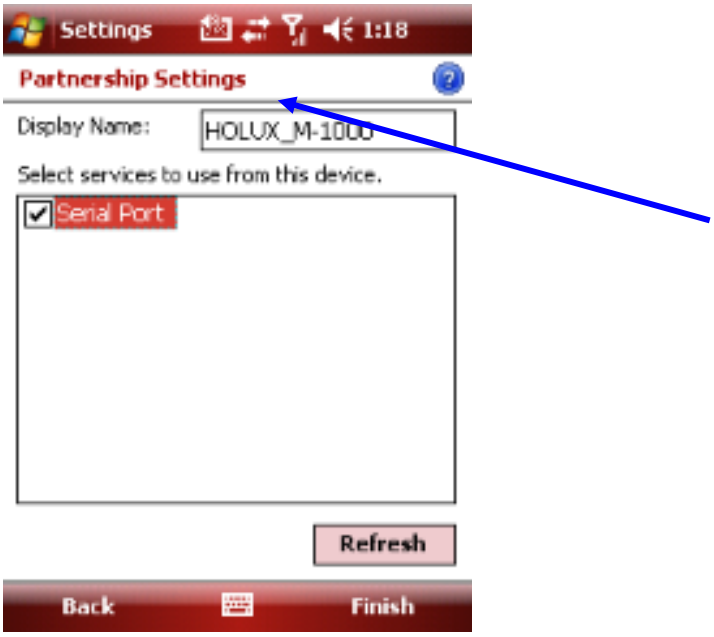
Step 8b.

Tap on **HOLUX_M-1000** to select it as the GPS device and tap **Next**.

Step 9b.

Enter ”0000” and tap **Next** (please refer to the Bluetooth GPS device’s manual for the correct Passcode).

The virtual keyboard was used to enter the Passcode.

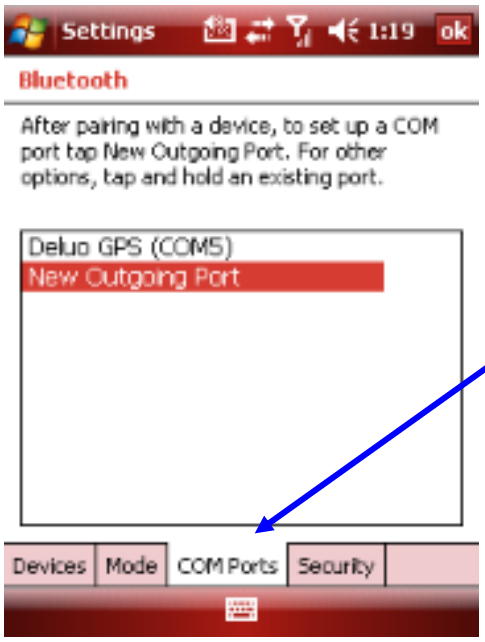


Step 10b.

In the **Partnership Settings** screen, tap on **Serial Port** and then tap on **Finish**. This will navigate back the **Devices** tab.

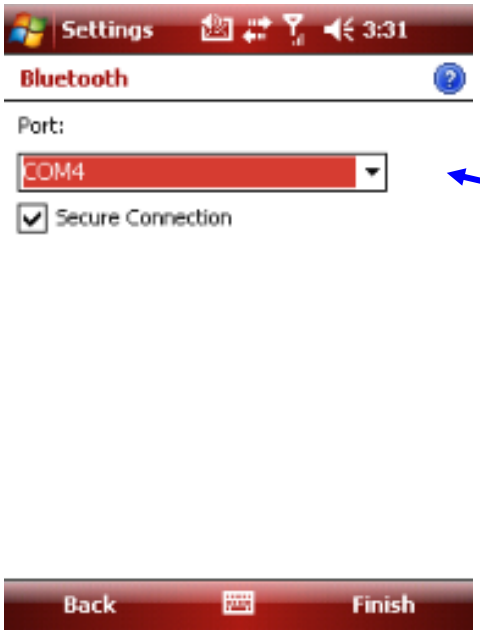
Step 10b.

Back to the **Devices** tab.



Step 11b.

Tap on **COM port** tab and tap on **New Outgoing Port**.

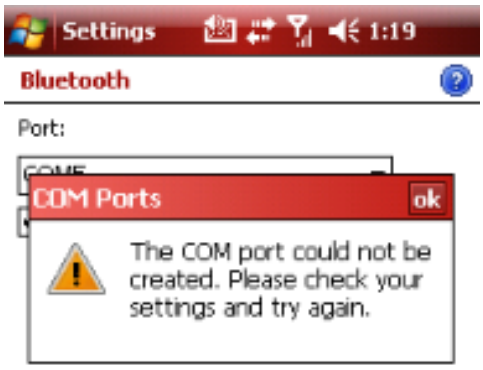


Step 12b.

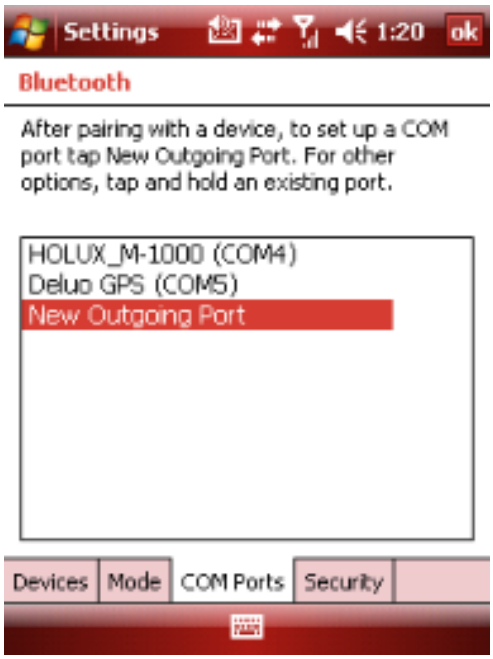
Since **Com5** is designated to the Deluo GPS device, choose **COM4** or any other allowable port from the pull-down menu.

Step 13b.

Tap on **Secure Connection** and tap on **Finish.** This navigates to the **COM Ports** tab.



As an illustration, choosing **COM5** (designated to the Deluo GPS) will display the error message to the left. Tap **OK** and re-enter another port.



Step 14b.

Tap **OK** on the top right

Step 15b.

This leads back to the **Connections** tab. The user can either exit by tapping the X on the upper right or use the Windows icon at the top left to return to ROVER

7.4.2 Partnering ROVER with a GPS Device

Once the Smartphone has been configured to communicate with the GPS device through one of its ports as described in **Section 7.4.1**, it is ready to be partnered or paired with ROVER. Once partnered, ROVER can communicate with the GPS to record the Latitude, Longitude and timestamp in the **New and Existing Sites Address** tab.

Step 1.

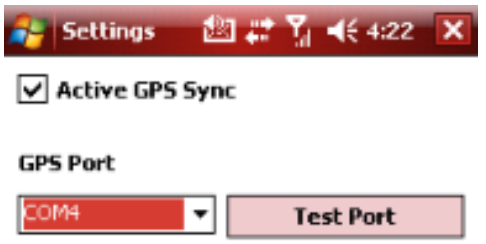
Ensure that the process in **Section 7.4.1** has been successfully completed and the GPS has identified its position (Refer to the GPS manual).

Step 2.

Launch ROVER and choose a Survey (Pre-EQ, Post-EQ, Detailed Post-EQ Survey). This will navigate to the Main Menu of the survey.

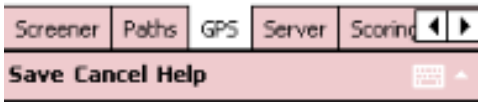
Step 3.

Tap on **Settings**.



Step 4.

Tap on the **GPS** tab.

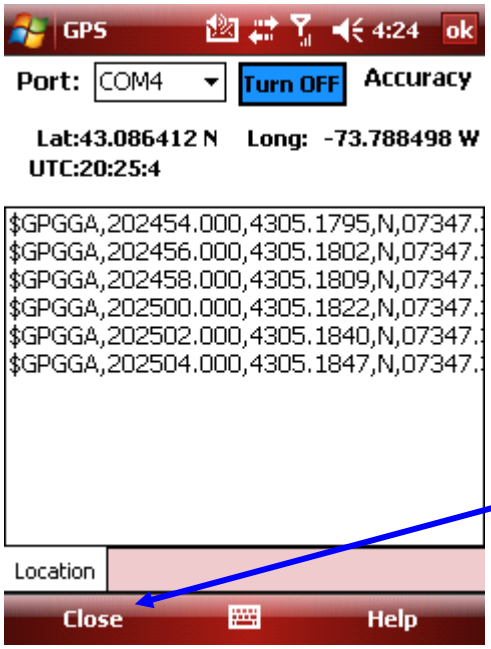


Step 5.

Check the **Active GPS Sync** box and verify that the **GPS Port** is correct for the device to be used, e.g., the port assigned to the GPS device from **Section 7.4.1** (**COM5** for Deluo GPS and **COM4** for HOLUX GPS).

Step 6.

Tap on **Test Port.**

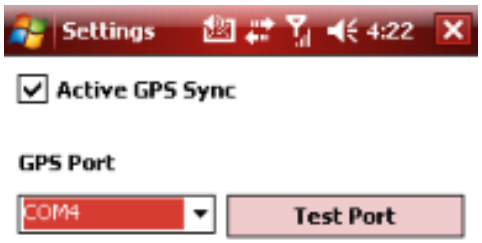


This will lead to the Location tab dynamically displaying **Lat**/**Lon** and **UTC** information, updated every few seconds.

Step 7.

Tap on **Close** to return to the **GPS** tab.

Note: The Test Port Button in the GPS tab in Settings and the GPS option at Main Menu in ROVER both lead to the same window displaying scrolling Lat/Lon and UTC values.



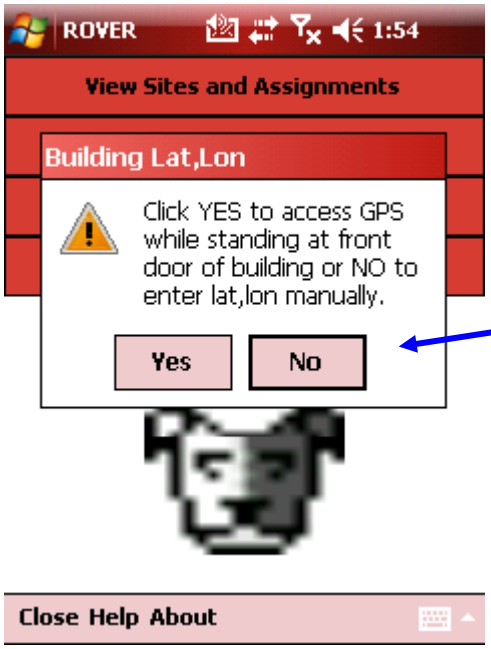
Step 8.

Tap on **Save** to return to the main menu of the Survey.

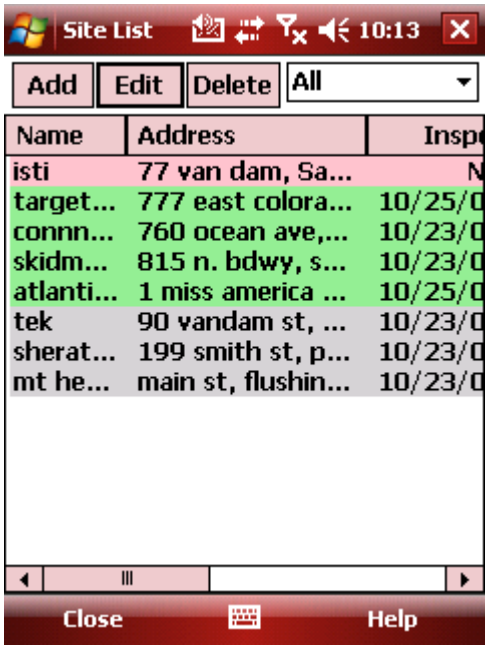
.

This navigates back to the Main menu.

7.5 Auto-Input vs. Manual input of Site Position



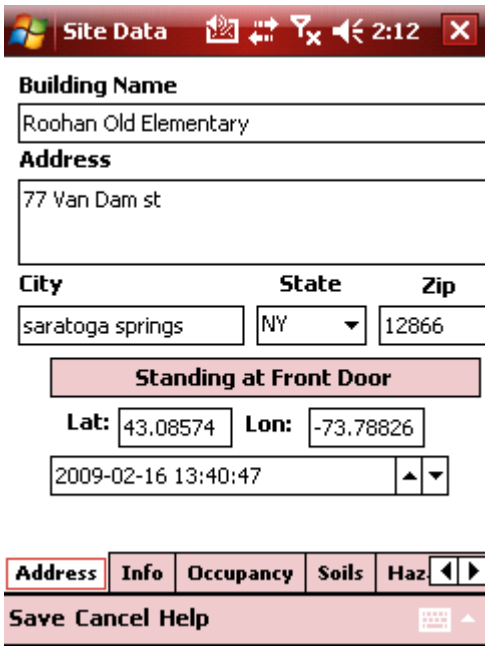
ROVER provides the user with the option to detect and enter the site coordinates using either a GPS device (click **Yes**) or entering the information manually (click **No**).



Step 1.

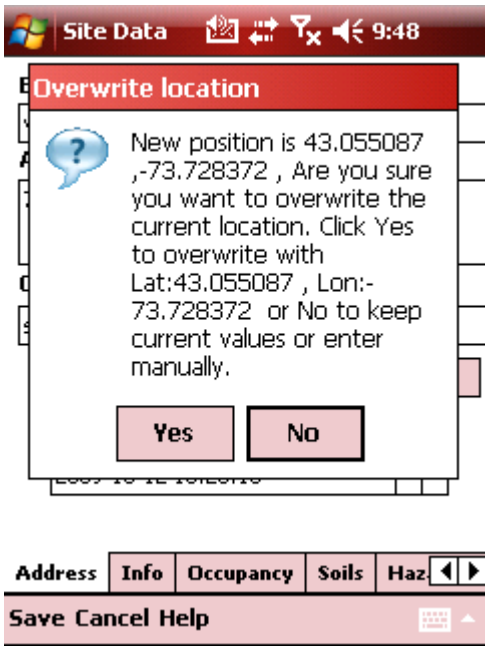
To access and enter the GPS coordinates tap **Yes**. This will lead to the **Site List** window. If editing an existing building's information select the site from the list and tap **Edit**, or tap **Add** to add a new building.

The "isti" Building was chosen to be edited.



Step 2.

Tap **Standing at Front Door**.


Site Data
9:48
Overwrite location
New position is 43.055087 ,-73.728372 , Are you sure you want to overwrite the current location. Click Yes to overwrite with Lat:43.055087 , Lon:-73.728372 or No to keep current values or enter manually.
Yes
No
Address
Info
Occupancy
Soils
Haz
Save Cancel Help

The **Overwrite Location** window appears. Tap **Yes** to overwrite. The new Lat and Lon information along with a new date and time stamp will replace the old values.

Tap **No** to manually enter the location and time information using the keyboard or stylus.

8 Client-Server Synchronization

The ROVER client-server synchronization software is a bi-directional process of synchronizing data between a smartphone (client), and desktop (server). Synchronizing accomplishes the following:

- The transfer (upload) of newly edited/added survey data from a client (or smartphone) to a server (or desktop) for an assigned user (screener)
- The transfer (download) of edited or added survey data from a server to an assigned screener
- The download of new survey assignments from the server to a specific screener
- The storage of Pre-, Post- and Detailed post- Earthquake Surveys as prescribed by FEMA 154 and ATC-20 in a central repository for one or more screeners

Synchronization can be performed in two ways:

- A wireless local area network (Wireless LAN or Wi-Fi) or the phone's data service can be used to communicate over the Internet
- A physical connection using a cable (or cradle) between the smartphone and a local desktop can be used to communicate via ActiveSync

In both cases, the client must be set up for either Wi-Fi or ActiveSync to be "on" before any synchronization of data can occur between the ROVER Server and Client. In general, the ROVER Server exists on a desktop that will have one or more internet addresses. The ROVER Client must reach the server via a single internet address. This is true whether using phone data service, Wi-Fi, USB or Bluetooth connection. Therefore, the Client must have the Server's IP address to initiate successful communication with the Server.

NOTE: The phone uses an "internet connection" to connect to the Rover Server. This connection can take one of a few forms:

1. Wi-Fi connection via a Wi-Fi access point
2. Phone company cellular connection
3. USB cable to computer/laptop

All of these are considered internet connections by the phone even though they may not appear to be such connections. In all three cases above, you may be able to access the

internet from Internet Explorer on the phone. If you can access the internet on your phone, your phone connectivity is correctly configured.

However, items 1 and 3 above can be configured in such a way that you cannot access the web. Connection to the internet will fail if your Wi-Fi access point is not connected to the internet, or if your laptop/desktop is not connected to the internet.

8.1 Activating Wi-Fi on the Smartphone

Wi-Fi provides wireless Internet access. Wi-Fi networks are 'self-discoverable', that is, no additional steps are needed for connectivity once the access point has been discovered. To use Wi-Fi, the smartphone must have access to the wireless access point of the service provider (public wireless points are known as "hotspots" and can range up to 100m in distance). Typically, the smartphone will have a WLAN switch that turns the feature on or off. After Wi-Fi has been turned on, the smartphone scans for available networks and displays a message in a pop-up window, allowing one to choose from a Wireless LAN (WLAN). The pop-up screen on a WM5+ smartphone might look like the figure below:

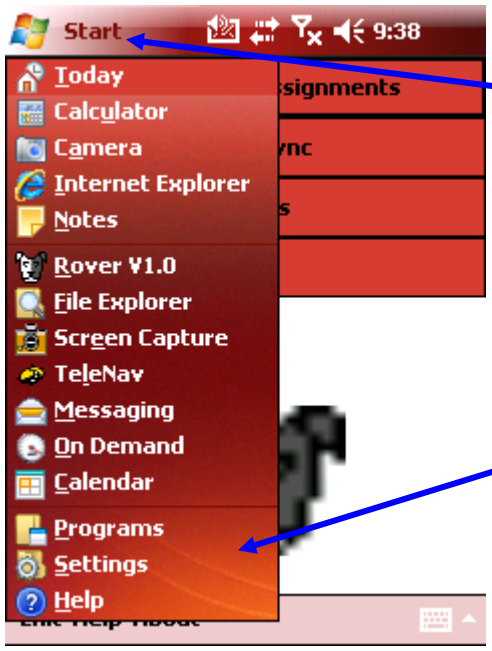
A next pop-up window might then follow allowing connection to the Internet or Work (if the connection is secured, a network key may be required). Once chosen, tap **Connect**.

Please refer to the specific smartphone's user guide for further details on Wi-Fi.

8.2 Network Configuration Using Wi-Fi

Step 1. Turn on Wi-Fi on the smartphone (refer to Section 8.1 and/or the user's manual for details)

Note: The smartphone must NOT be connected to the desktop via ActiveSync Connection (USB cable or cradle). This will cause an error that will require restarting ROVER.

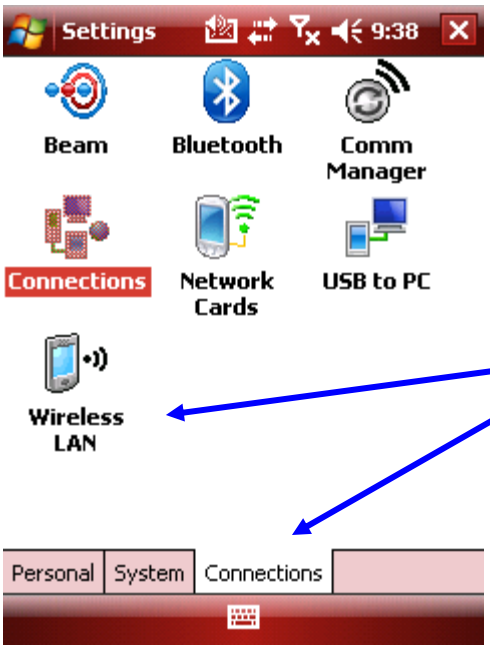


Step 2.

Tap **Start**.

Step 3.

Tap **Settings**.

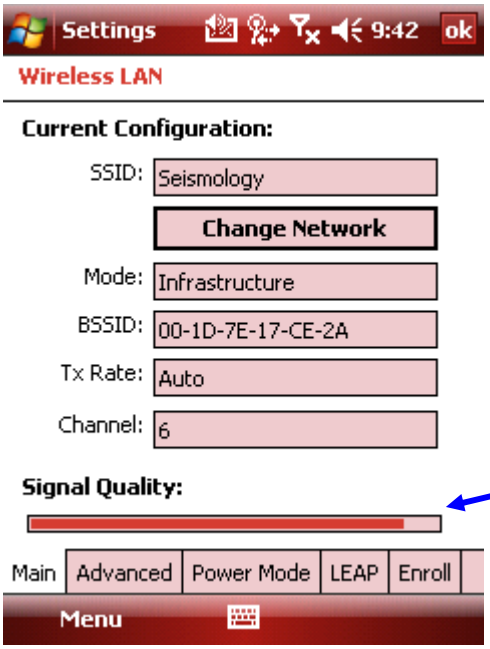


Step 4.

Tap **Connections**.

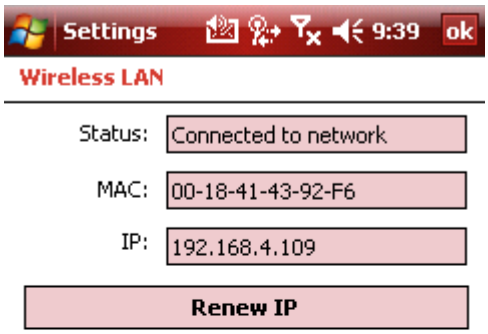
Step 5.

Tap **Wireless LAN**.

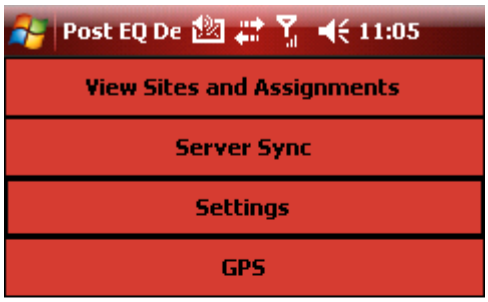


- In **Main** tab, ensure that smartphone is connected to a network and detecting a high **Signal Quality**.

Note: **It may be necessary to contact the system administrator to properly configure the Wireless LAN on the smartphone**. Information such as the correct network name, type of authentication, type of data encryption, network key number and type of network access are site specific and should be obtained from the system administrator.

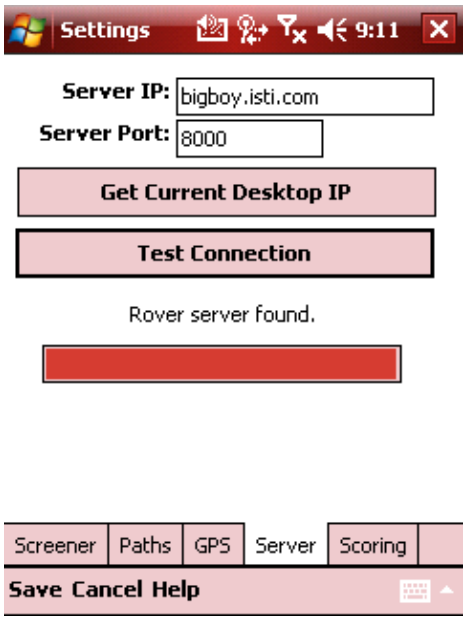


- In **Advanced** tab, the user can see the **Status**, **MAC** address, and **IP** address of the network through which the smartphone will access the internet. Tap **Ok** at top left and exit.



Step 6.

In ROVER tap **Settings** on the main menu.



Step 7.

Tap on the **Server** tab. Enter the ROVER **Server IP** and **Port** for the smartphone to connect to.

Step 8.

Tap **Test Connection**. Once server is found, tap **Save** to go back to main menu.

8.2.1 Connection to ROVER Server via Wi-Fi

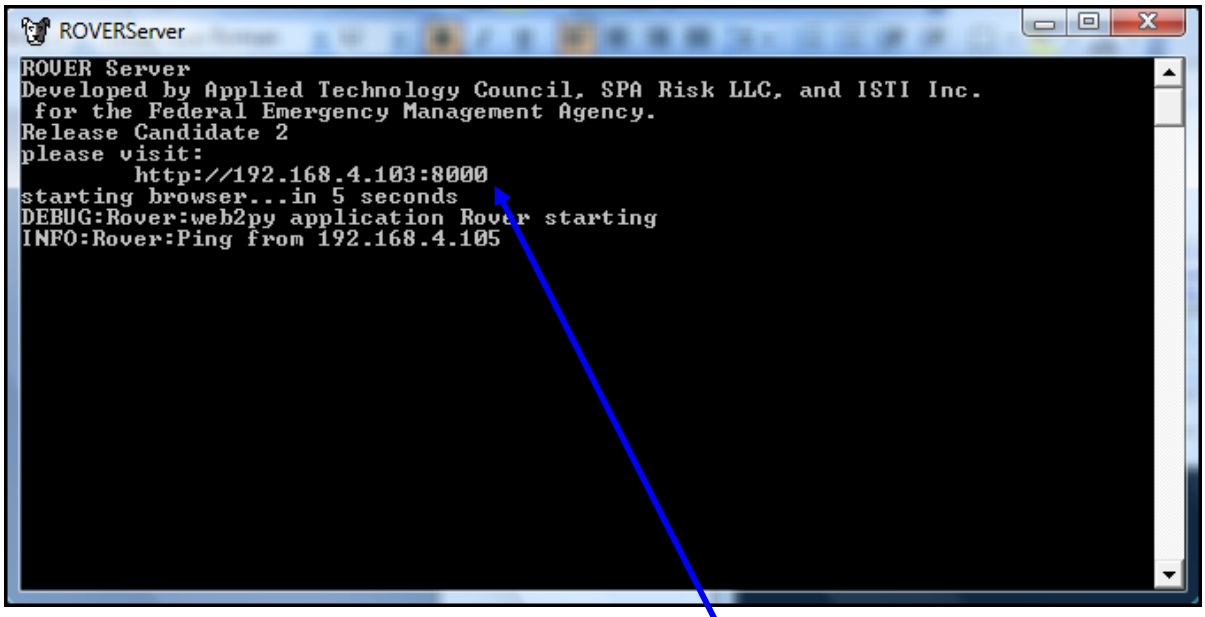
Note: The user must be sure that the smartphone can access the Internet via Wi-Fi. To check for connectivity in the startup screen, tap on **Start** in the upper left corner, and tap on **Internet Explorer** in the popup menu. If Internet Explorer does not launch on the smartphone, then ROVER Client and Server CANNOT be synchronized. Please refer to Section 8.1 for instructions on connecting to the internet.

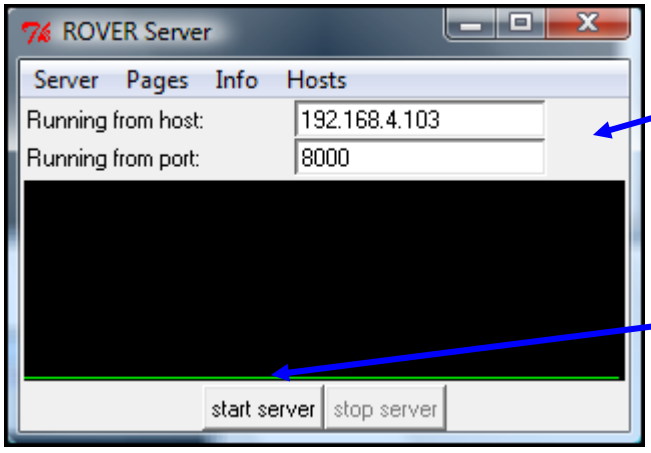
Step 1. Launch **ROVERServer** by clicking on the **ROVERServer** Shortcut on the desktop (or through Windows Explorer → All Programs → ROVERServer).Connect the smartphone to the desktop via a USB cable or cradle

Note: The host number of the server provided in the next two screens as (http://192.168.4.103:8000) is shown as an example, only to demonstrate the unique IP address of the desktop containing the ROVER Server. The ROVER Server is pro-

grammed to identify the IP addresses of the interfaces that are available for use on the desktop and will offer them as choices to the user for the server to use.

Step 2. Note the IP address of the server

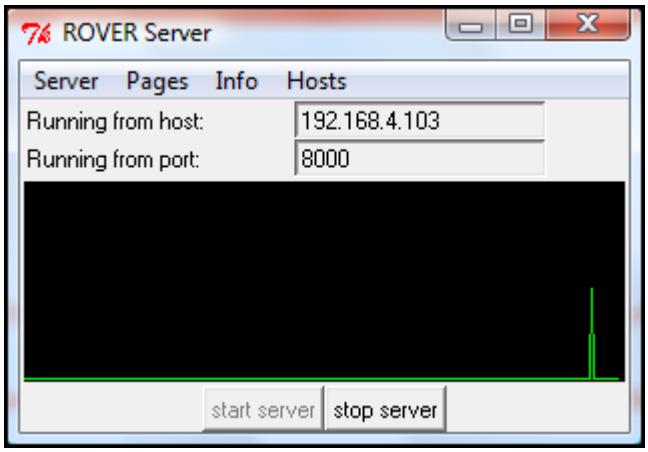


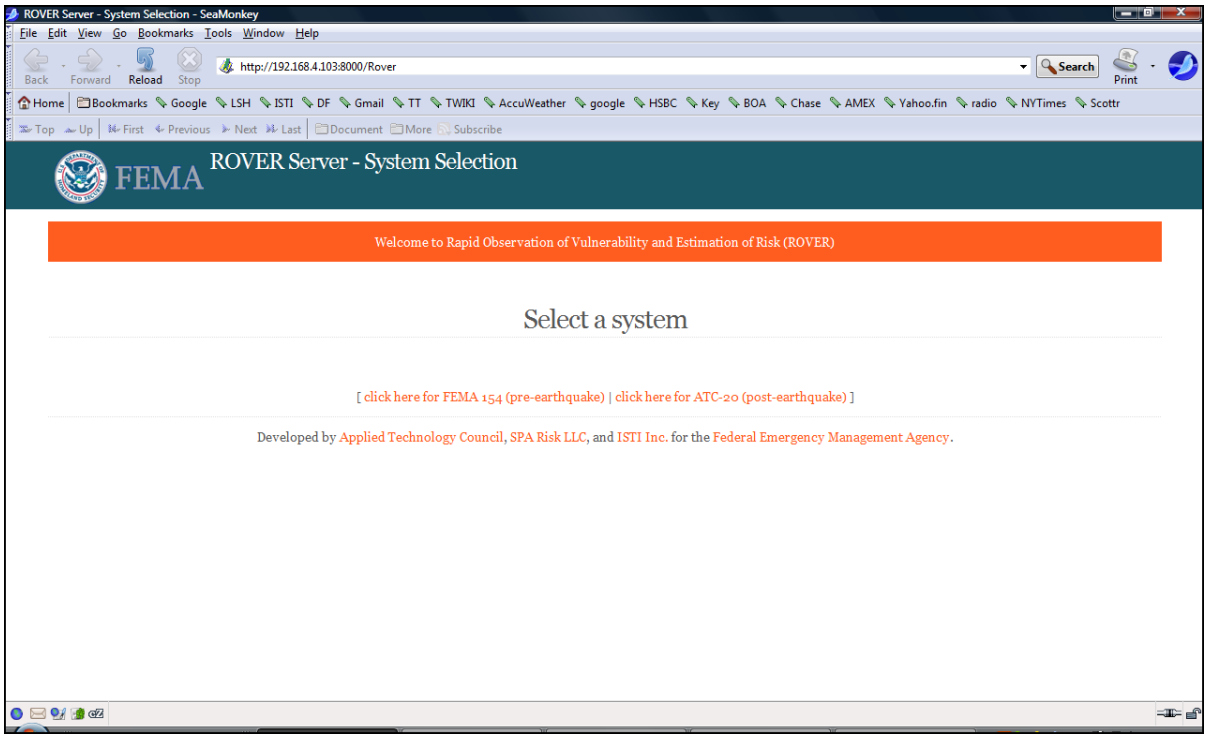


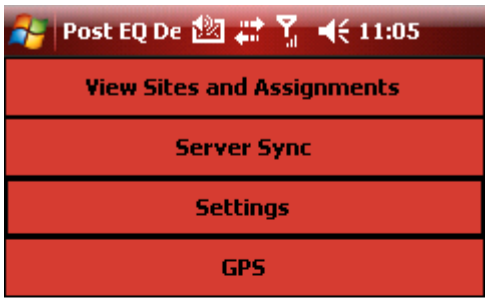
Server IP address and port are shown in the following places

Step 3.

Click on **Start Server**

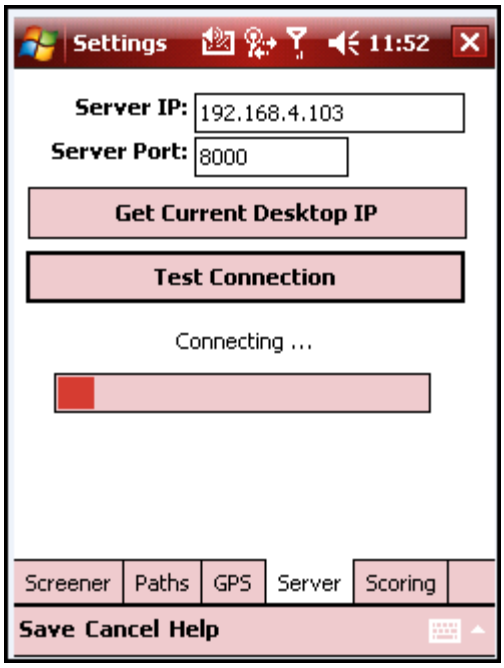

ROVER Server
Server
Pages
Info
Hosts
Running from host:
192.168.4.103
Running from port:
8000
start server
stop server


ROVER Server - System Selection - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://192.168.4.103:8000/Rover
Search
Print
Home Bookmarks Google LSH ISTI DF Gmail TT TWIKI AccuWeather google HSBC Key BOA Chase AMEX Yahoo.fin radio NYTimes Scottr
Top Up First Previous Next Last Document More Subscribe
FEMA
ROVER Server - System Selection
Welcome to Rapid Observation of Vulnerability and Estimation of Risk (ROVER)
Select a system
[click here for FEMA 154 (pre-earthquake) | click here for ATC-20 (post-earthquake)]
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.



Step 4.

In ROVER tap **Settings** on the main menu.



Step 5.

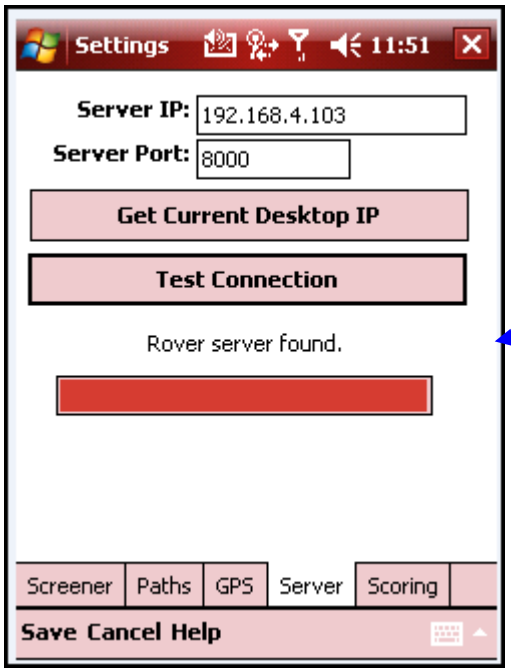
Tap on the **Server** tab.

Step 6.

If the IP address and port numbers are not already detected and displayed, manually enter the IP address and Port numbers from Step 2 in the **Server IP** and **Server Port** boxes.

Step 6.

Tap on **Test Connection**.



Step 7.

Once the server is found, tap **Save** to return to the main menu.

8.3 Setting Up ActiveSync on Windows

Generally, the smartphone package includes a software installation CD that contains the Microsoft ActiveSync (using a USB cable) software. The user should follow the instructions to install and set up ActiveSync on the particular Windows operating system. This allows the synchronization and management of files, music, photos, videos, etc. A list of compatible Windows systems is provided at:

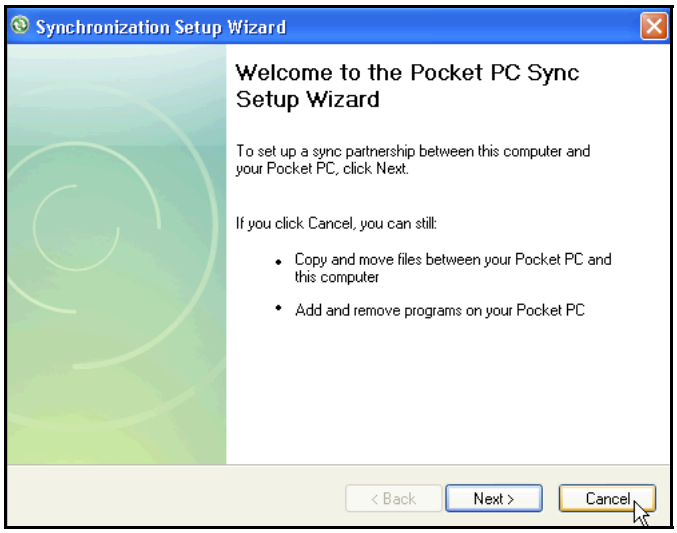
http://www.microsoft.com/windowsmobile/activesync .

For the purpose of ROVER, the following sections describe the procedure for connection settings for the smartphone device. These instructions pertain to synchronizing the ROVER Client and Server's associated files and bypass the synchronization and management of other content on the smartphone, such as music, etc.

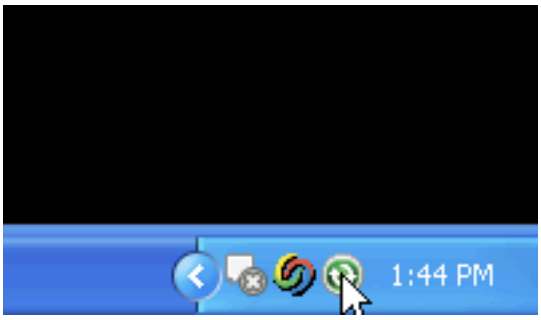
8.3.1 ActiveSync on Windows XP and Other

After installing the software, connect the smartphone to the PC via a USB cable (or cradle).

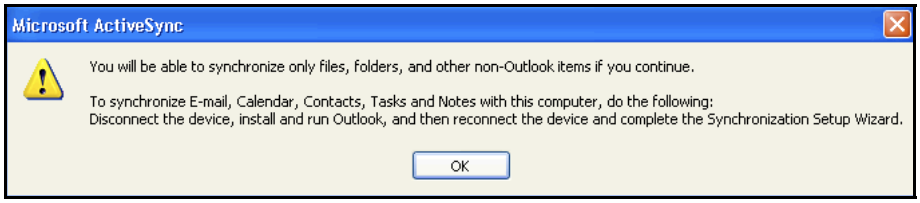
This will start the Setup Wizard:


Synchronization Setup Wizard
Welcome to the Pocket PC Sync Setup Wizard
To set up a sync partnership between this computer and your Pocket PC, click Next.
If you click Cancel, you can still:
Copy and move files between your Pocket PC and this computer
Add and remove programs on your Pocket PC
< Back
Next >
Cancel

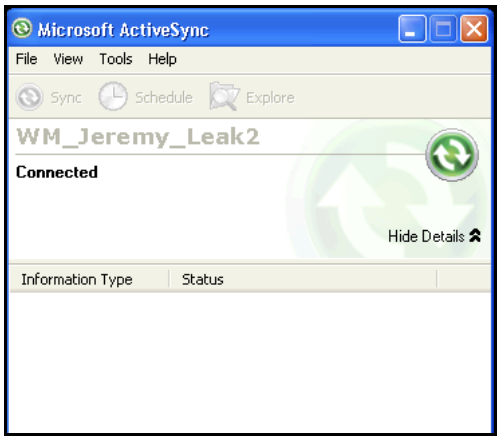
Click **Cancel** to copy, move, add or remove files between the desktop and the smartphone.

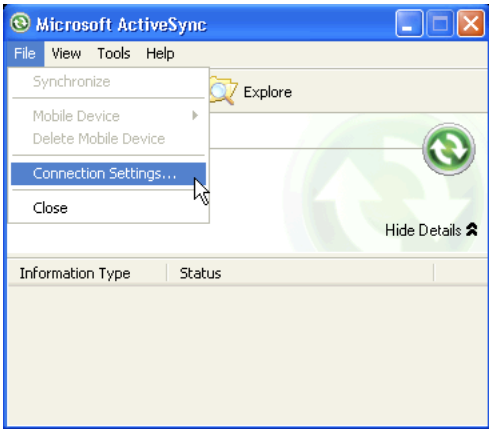


Alternatively, click on synchronization icon on the desktop.

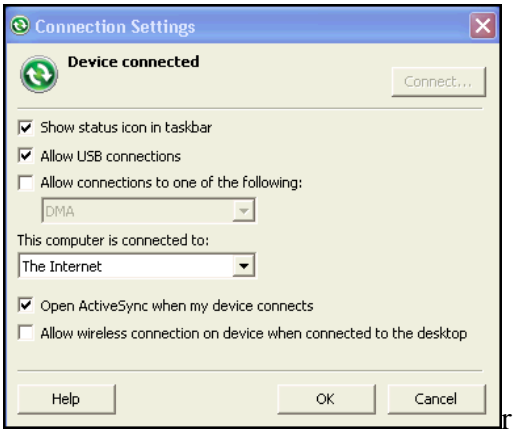

Microsoft ActiveSync
You will be able to synchronize only files, folders, and other non-Outlook items if you continue.
To synchronize E-mail, Calendar, Contacts, Tasks and Notes with this computer, do the following:
Disconnect the device, install and run Outlook, and then reconnect the device and complete the Synchronization Setup Wizard.
OK

Tap **OK**.





Tap **File → Connection Settings**.



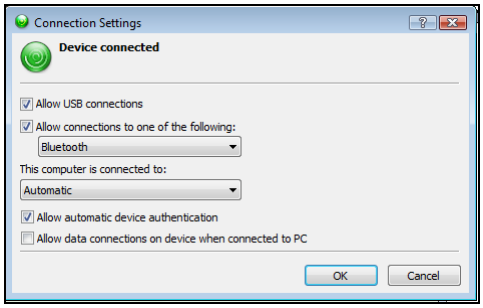
r

Note: The final check box ("Allow wireless connection on device when connected to the desktop") may or may not need to be unselected. However, sometimes the behavior of the smartphone's USB-Internet connection may be more reliable with the box NOT checked.

8.3.2 ActiveSync on Windows Vista

After installing the software, connect the smartphone to the PC via a USB cable (or cradle). The Windows Mobile Device Center will appear.

Under **Mobile Device Settings**, tap **Connection Settings**.



Note: The final check box ("Allow wireless connection on device when connected to the desktop") may or may not need to be unselected. However, sometimes the behavior of the smartphone's USB-Internet connection may be more reliable with the box NOT checked.

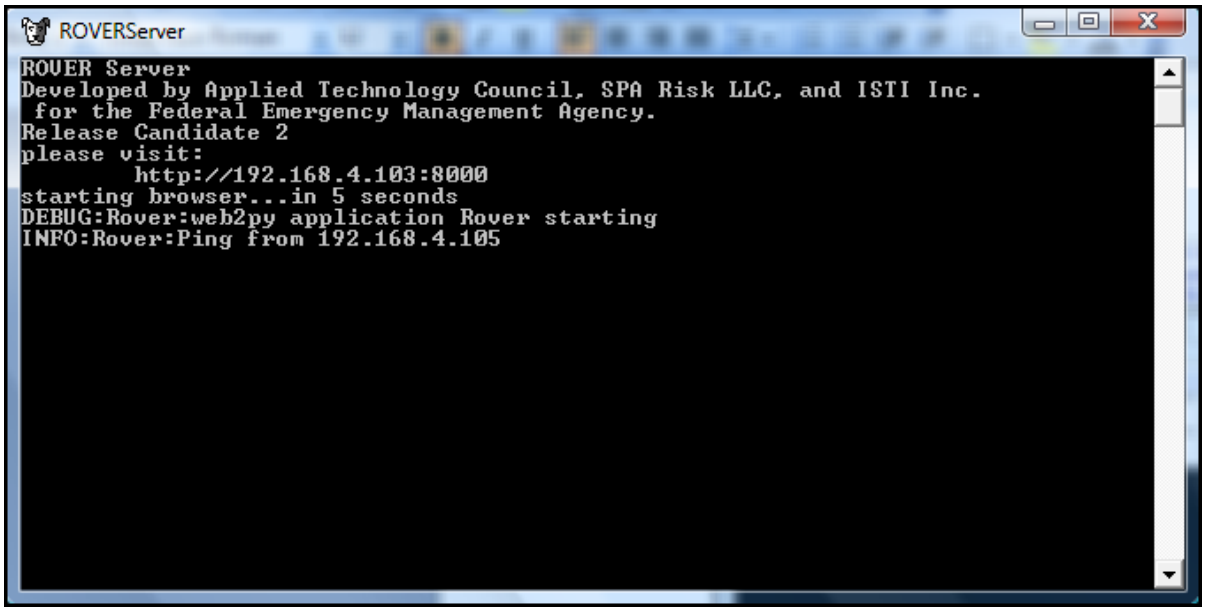
8.3.3 Connection to ROVER Server via ActiveSync

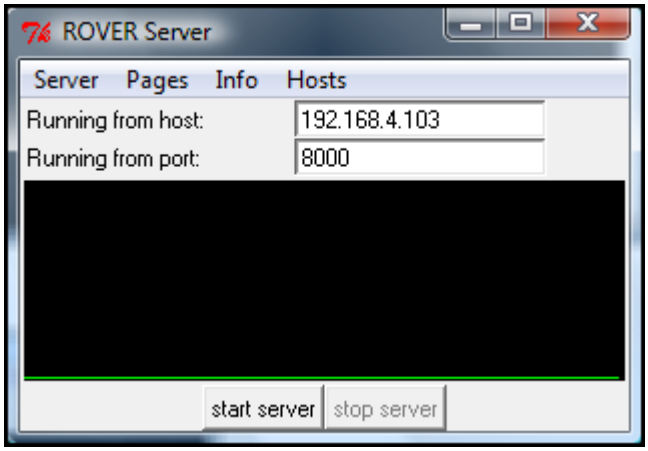
Note: The user must be sure that the smartphone can access the Internet via the Active-Sync (USB cable or cradle). If Mobile Internet Explorer does not launch on the smartphone, then ROVER Client and Server CANNOT be synchronized. Please refer to Section 8.1 – 8.3.1 for instructions on connecting to the internet.

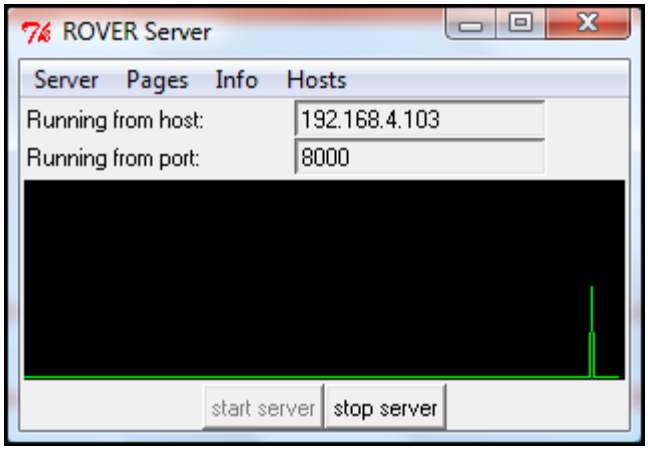
Step 1. Connect the smartphone to the desktop via a USB cable or cradle

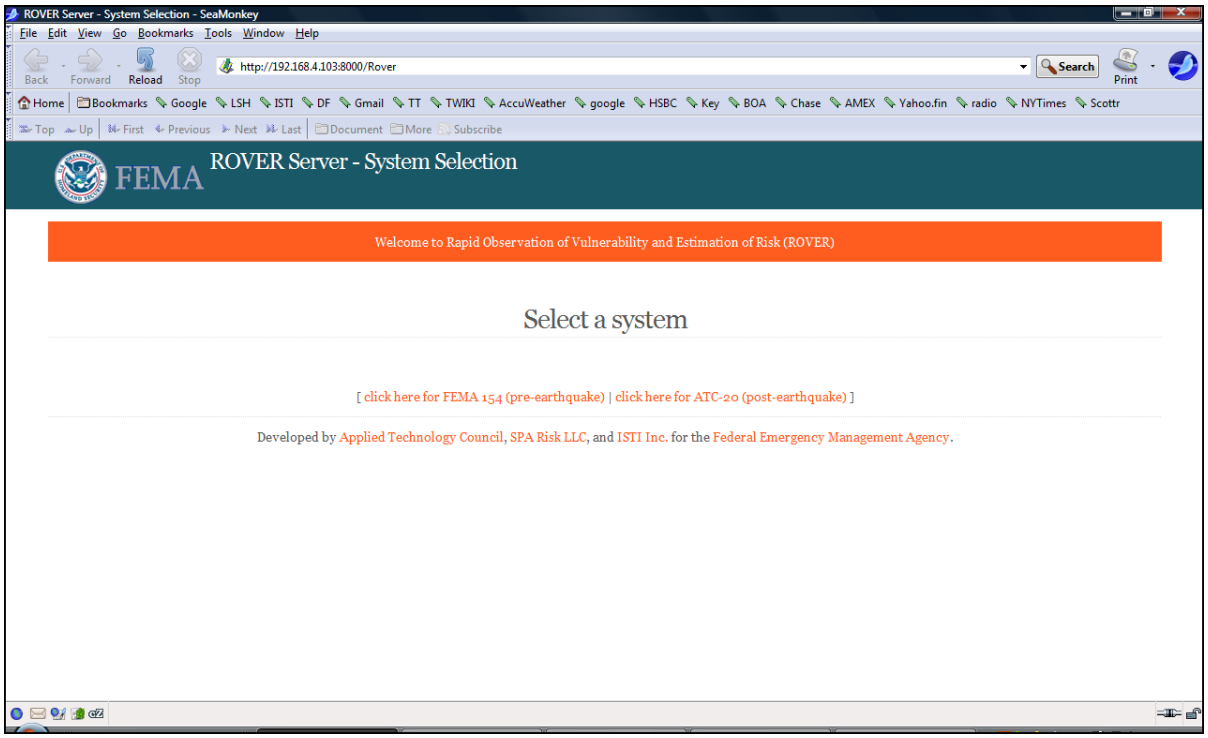
Step 2. Launch **ROVERServer** by clicking on the **ROVERServer** Shortcut on the desktop (or through Windows Explorer → All Programs → ROVERServer).

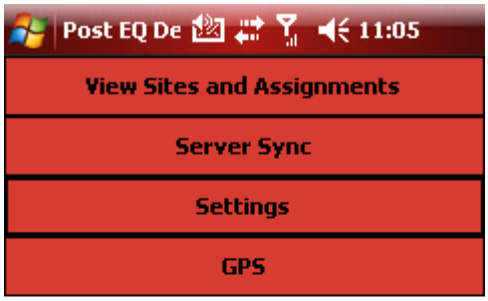
Note: The host number provided in the next two screens (http://192.168.4.103:8000) is shown as an example, only to demonstrate the unique IP address of the desktop containing the ROVER Server. The ROVER Server is programmed to identify the IP addresses of the interfaces that are available for use on the desktop and will offer them as choices to the user for the server to use.


ROVERServer
ROVER Server
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc.
for the Federal Emergency Management Agency.
Release Candidate 2
please visit:
http://192.168.4.103:8000
starting browser...in 5 seconds
DEBUG:Rover:web2py application Rover starting
INFO:Rover:Ping from 192.168.4.105


ROVER Server
Server
Pages
Info
Hosts
Running from host:
192.168.4.103
Running from port:
8000
start server
stop server

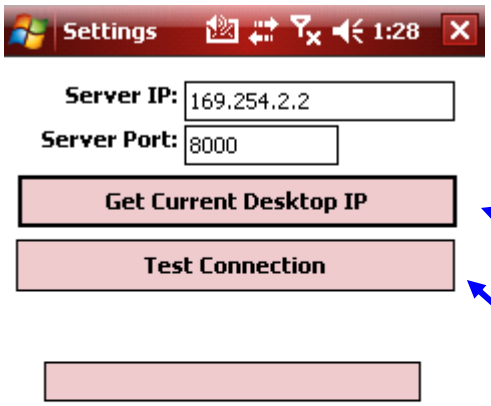

ROVER Server
Server
Pages
Info
Hosts
Running from host:
192.168.4.103
Running from port:
8000
start server
stop server


ROVER Server - System Selection - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://192.168.4.103:8000/Rover
Search
Print
Home Bookmarks Google LSH ISTI DF Gmail TT TWIKI AccuWeather google HSBC Key BOA Chase AMEX Yahoo.fin radio NYTimes Scottr
Top Up First Previous Next Last Document More Subscribe
FEMA
ROVER Server - System Selection
Welcome to Rapid Observation of Vulnerability and Estimation of Risk (ROVER)
Select a system
[click here for FEMA 154 (pre-earthquake) | click here for ATC-20 (post-earthquake)]
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.



Step 3 .

In ROVER tap **Settings** on the main menu.

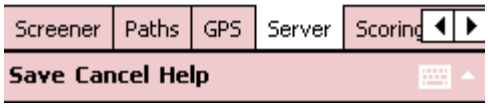


Step 4 .

Tap on the **Server** tab.

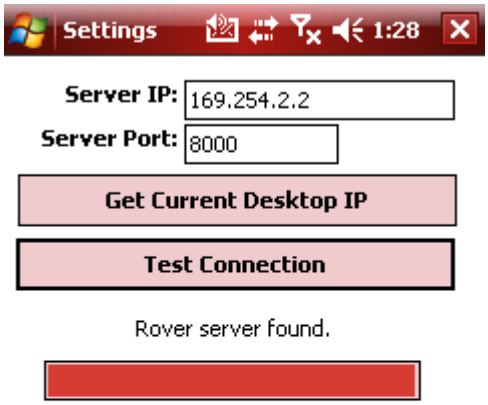
Step 5.

Tap on **Get Current Desktop IP**. ActiveSync uses169.254.2.2 as a general IP number for any desktop connected to the smartphone.



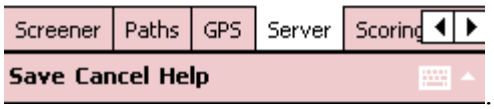
Step 6.

Tap on **Test Connection**.



Step 7.

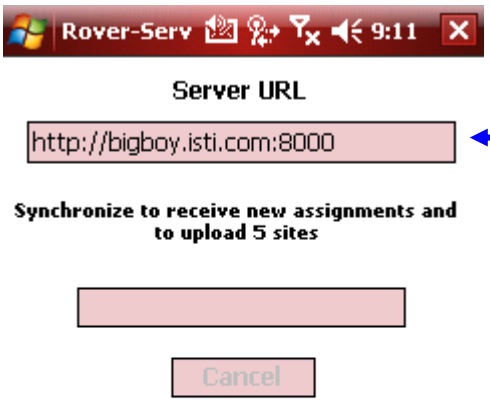
Once the server is found, tap **Save** to go back to main menu.



8.4 Synchronization Process

Note: The server URL provided in the following screens (http://bigboy.isti.com:8000) is communicating with a ROVER Server installed on a remote desktop accessed via the Internet, as opposed to a ROVER Server installed on the local desktop. This example still demonstrates the unique IP address of the desktop containing the ROVER Server.

Remember that the Server URL is specified when launching the Server. (Settings → Server → Server IP:



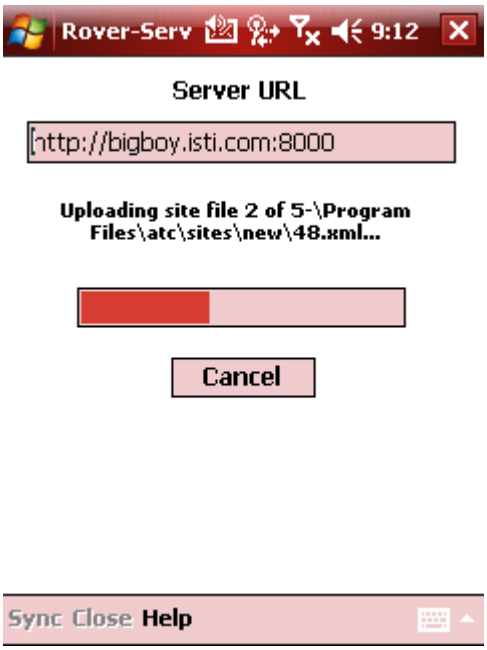
Note that in this example, a remote server was accessed via the internet.

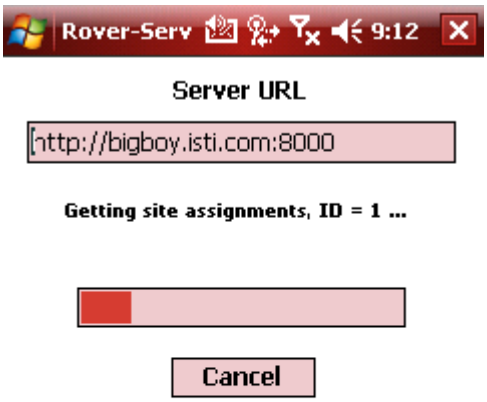
Using the **Host** IP number 192.168.4.103 obtained from the ROVER Server in the previous **Settings** section would have led to the ROVER Server residing on that desktop.

Alternatively, the user can tap on **Get Current Desktop IP using ActiveSync**, and use the Server IP that is returned for the ROVER Server installed on any desktop. ActiveSync uses169.254.2.2 as a general IP number for any desktop connected to the smartphone.

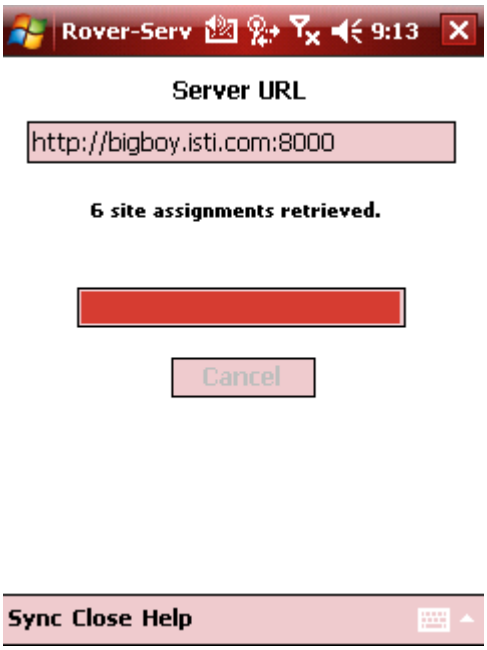
It is good practice to **Test Connection** to verify that the ROVER Server is found.

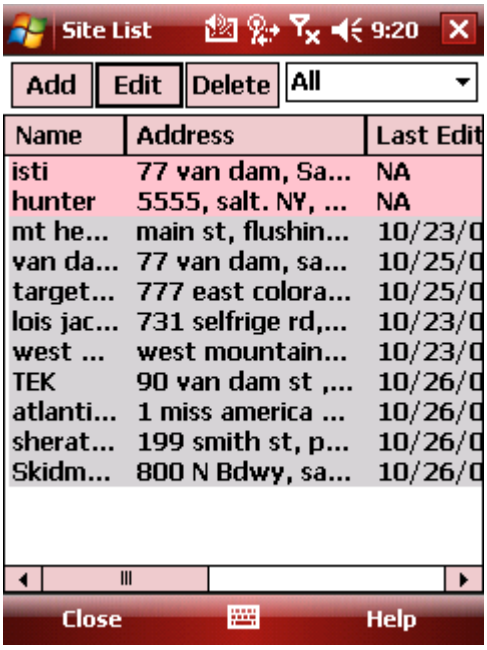
The Synchronization process first uploads or retrieves the site files from the smartphone into the Server.





The synchronization process next downloads the assigned site files from the server into the smartphone.





The synchronization process finally displays a color-coded list of sites, according to what is uploaded to the server (grey) and new sites that need to be inspected (pink).

9 Using the ROVER Server

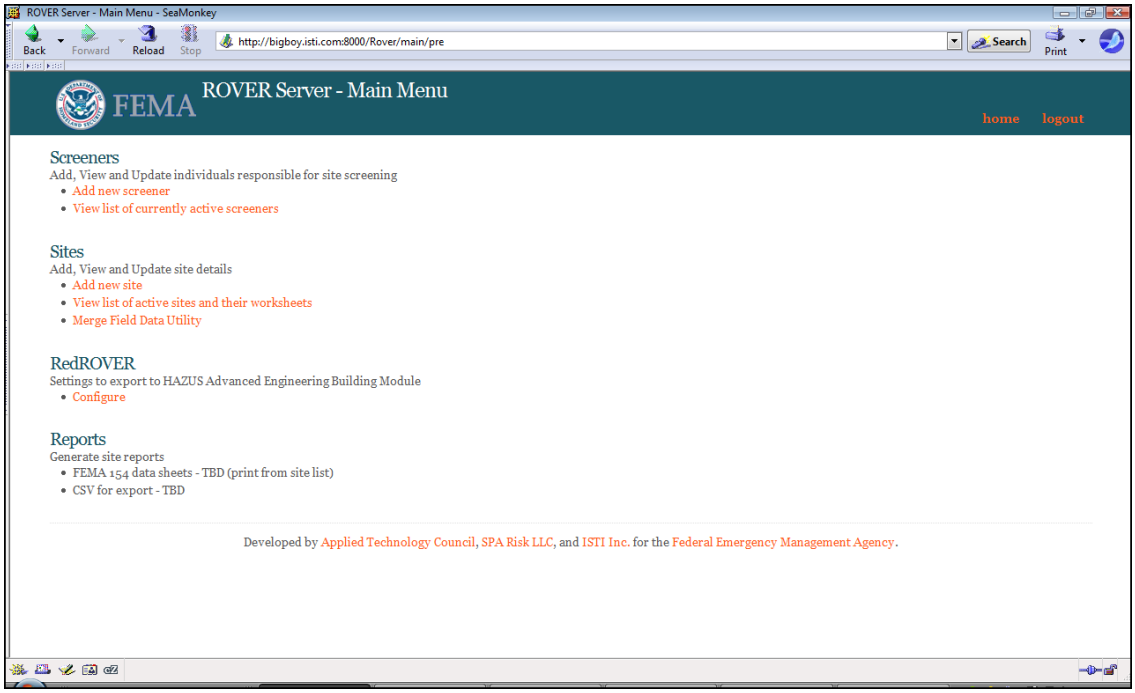
The ROVER server is a user interface that contains the database of pre-, post- and detailed post-earthquake sites. The server can operate on an ordinary Windows, Linux or Macintosh desktop or laptop computer and is the repository of information.

The server consists of two modules, a pre-earthquake module and a post-earthquake module. Each module displays site information according to the corresponding paper-based worksheet for the survey; the pre-earthquake information is displayed in the format of the FEMA 154 worksheet, and the post-earthquake information is displayed in the format of the ATC-20 worksheet. The server also provides the ability to add or edit worksheets on the server and later synchronize with the client (smartphone).

9.1 Account Management

There are two types of accounts in ROVER:

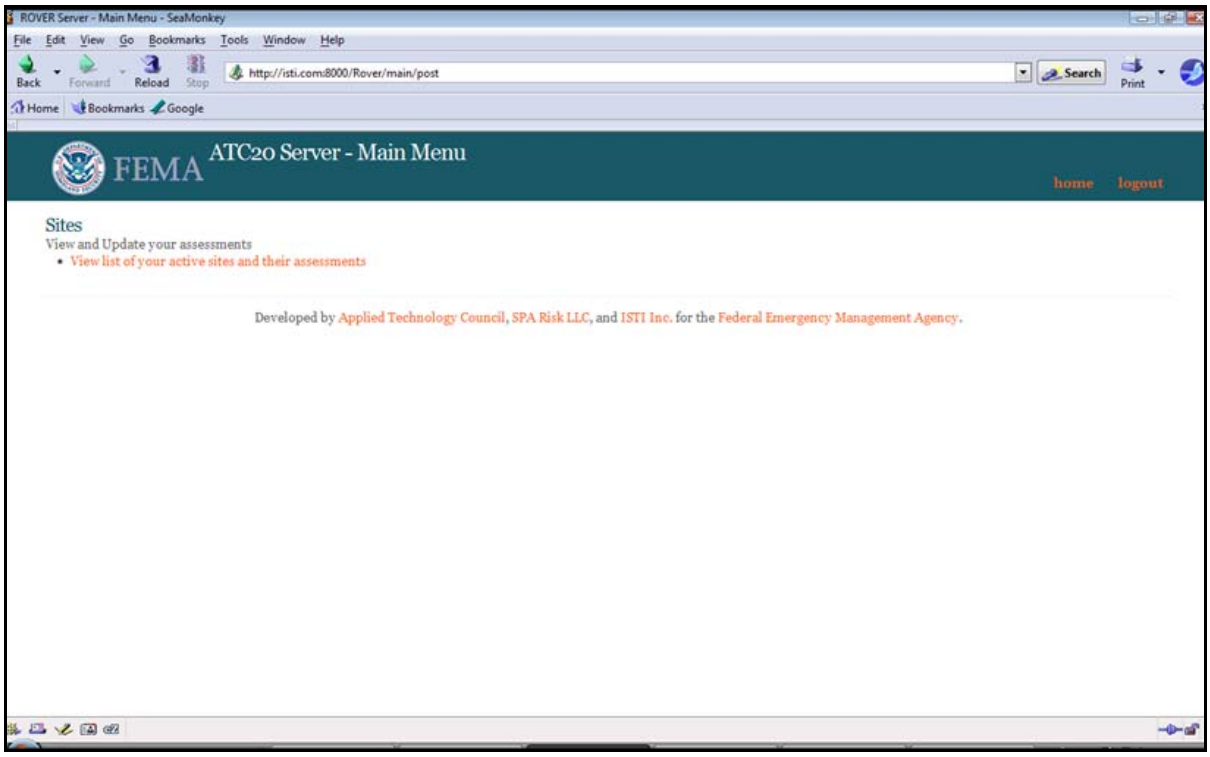
- Administrative (Admin) account – ROVER provides an enhanced interface that displays the site listing for all users with the following privileges:



- The ability to add/edit/delete inspectors

- The ability to view sites and add/edit/delete worksheets for all users on the database
- The ability to assign sites to specific inspectors
- A field data utility that can merge lat/lon and timestamp information from the track log of a non-Bluetooth GPS device (or photos from an independent camera) with the site information entered in ROVER

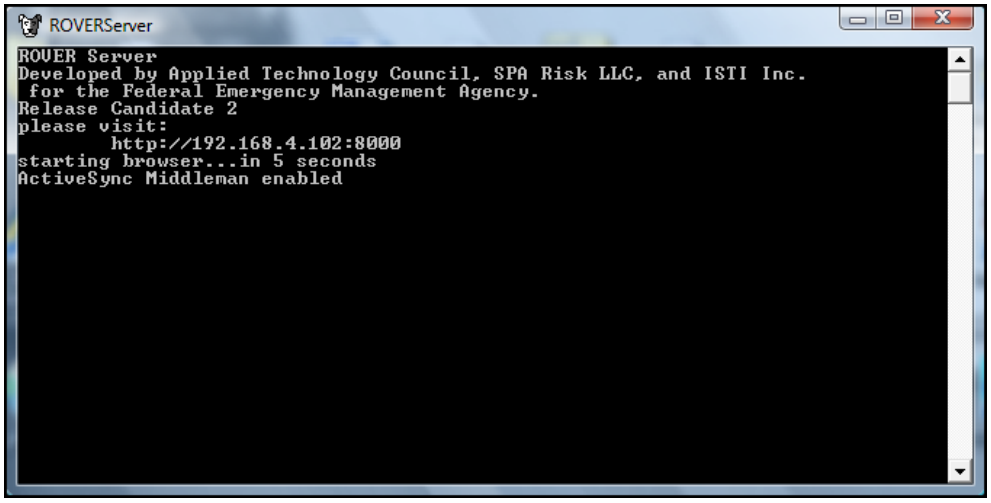
- Screener (Inspector) account – ROVER provides the user a restricted interface that allows for viewing, adding/editing/deleting information in the user's worksheets in both modules.

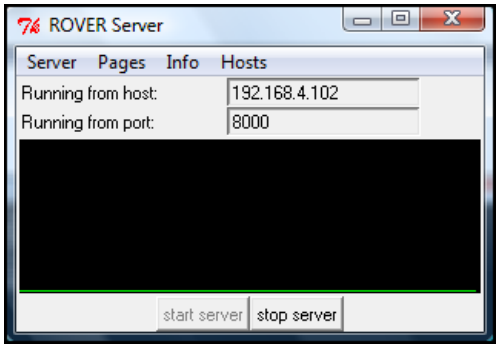

ROVER Server - Main Menu - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://isti.com:8000/Rover/main/post
Search
Print
Home Bookmarks Google
FEMA
ATC20 Server - Main Menu
home logout
Sites
View and Update your assessments
View list of your active sites and their assessments
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.

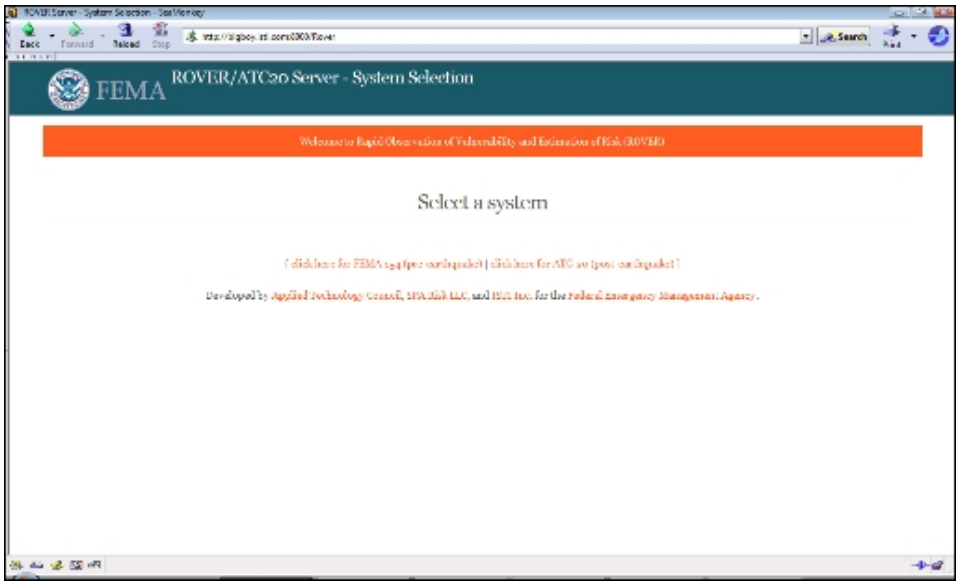
9.2 Launching the ROVER Server

Launch **ROVERServer** by clicking on the **ROVERServer** Shortcut on the desktop (or through Windows Explorer → All Programs → ROVERServer).

Note: The host number provided in the next two screens (http://192.168.4.102:8000) is shown as an example, only to demonstrate the unique IP address of the desktop containing the ROVER Server. The ROVER Server is programmed to identify the IP addresses of the interfaces that are available for use on the desktop and will offer them as choices from which the user can select.





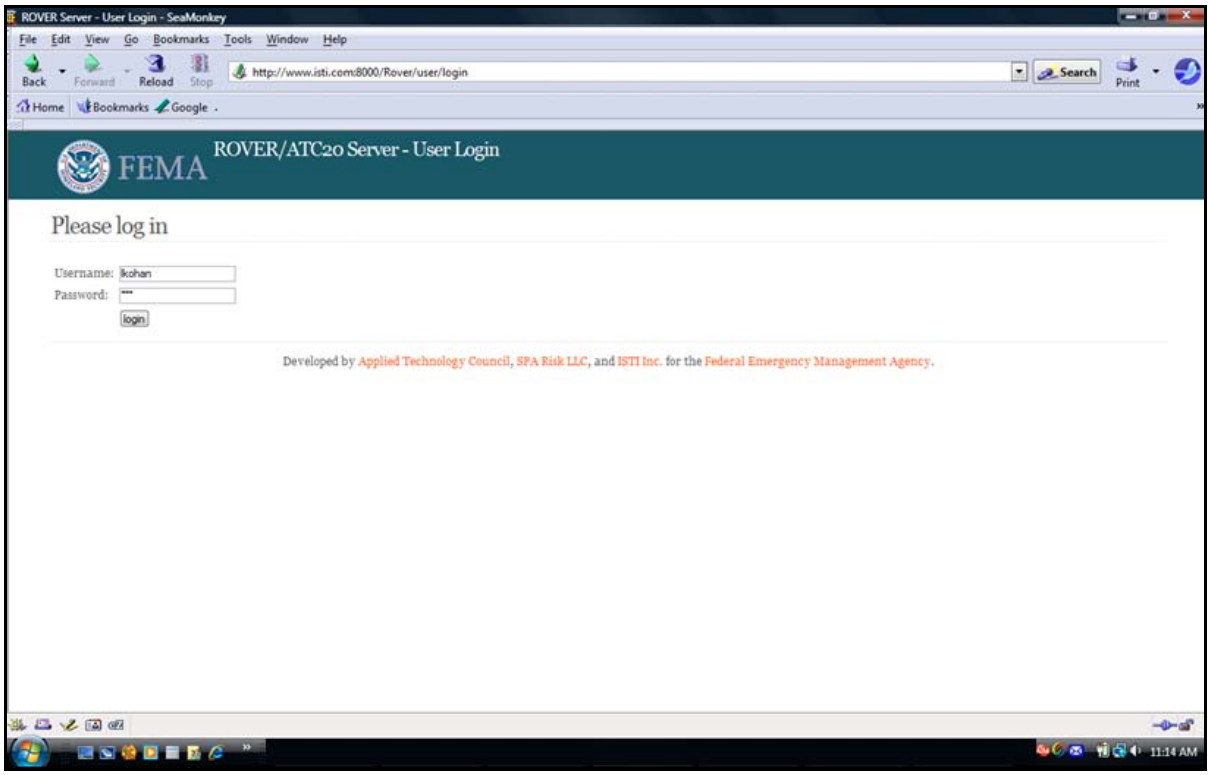


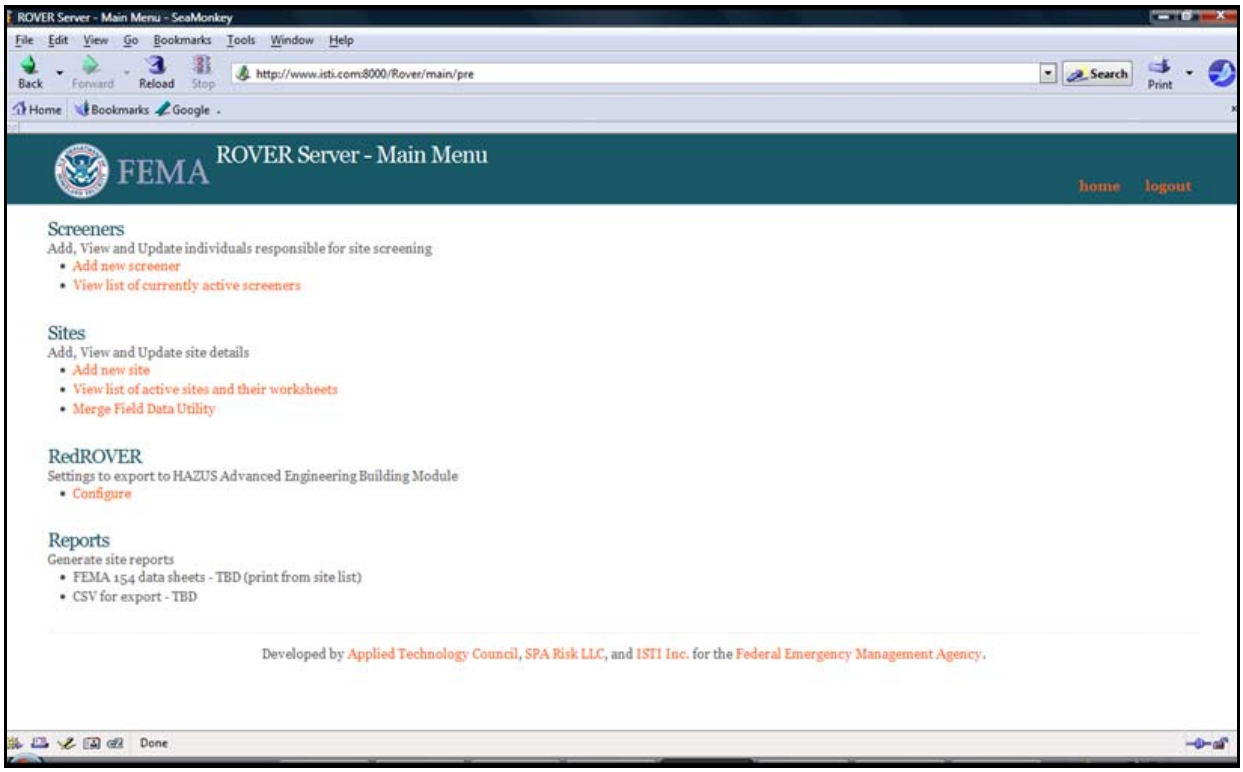
ROVER/ATC20 Server - System Selection screen

9.3 Using ROVER Server with an Administrator Account

9.3.1 The FEMA154 (Pre-Earthquake) Module:

- In the ROVER/ATC-20 Server - System Selection screen, click on **FEMA 154 (Pre-Earthquake)**
- Enter **Username** and **Password** and click **Login.** To use a general Administrator account, the user can use the default "Admin" for **Username** and "rover" for **Password**.

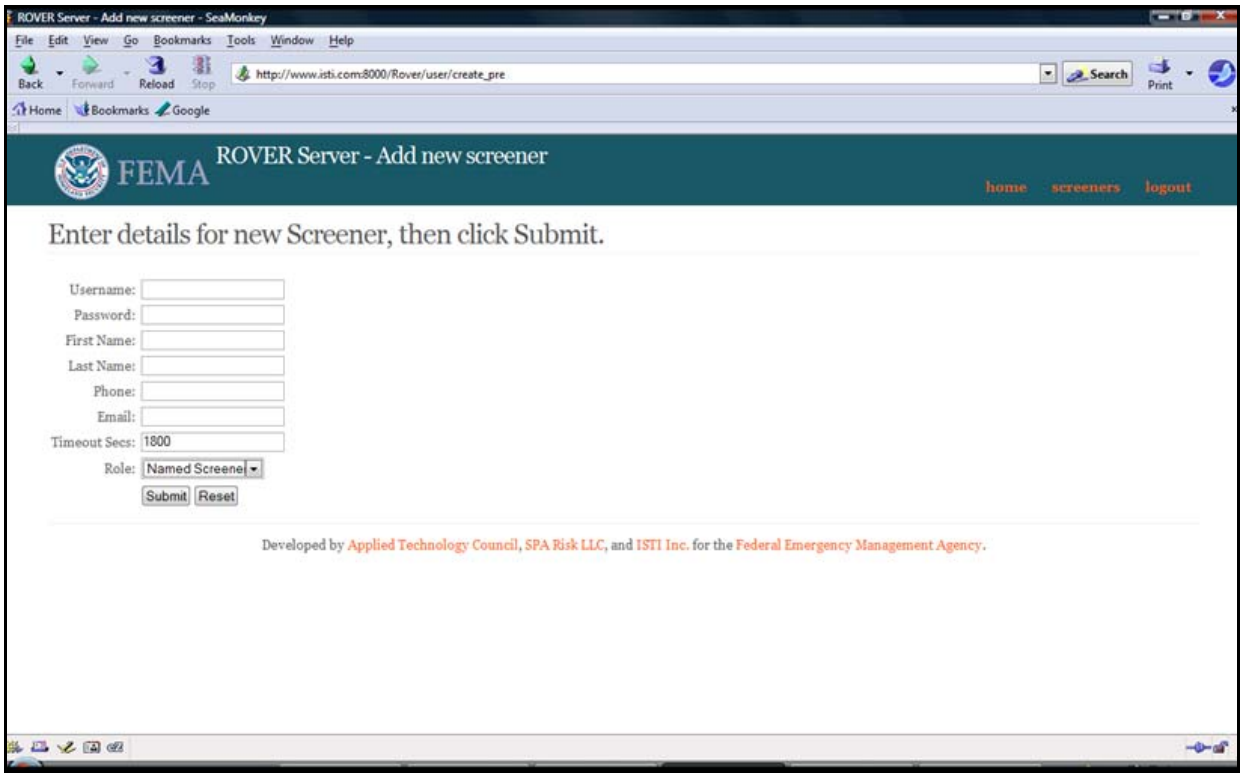

ROVER Server - User Login - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/user/login
Search
Print
Home Bookmarks Google
FEMA
ROVER/ATC20 Server - User Login
Please log in
Username: kohan
Password:
login
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
11:14 AM


ROVER Server - Main Menu - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/main/pre
Search
Print
Home Bookmarks Google
FEMA
ROVER Server - Main Menu
home logout
Screeners
Add, View and Update individuals responsible for site screening
Add new screener
View list of currently active screeners
Sites
Add, View and Update site details
Add new site
View list of active sites and their worksheets
Merge Field Data Utility
RedROVER
Settings to export to HAZUS Advanced Engineering Building Module
Configure
Reports
Generate site reports
FEMA 154 data sheets - TBD (print from site list)
CSV for export - TBD
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
Done

9.3.1.1 Menu Options for Screeners

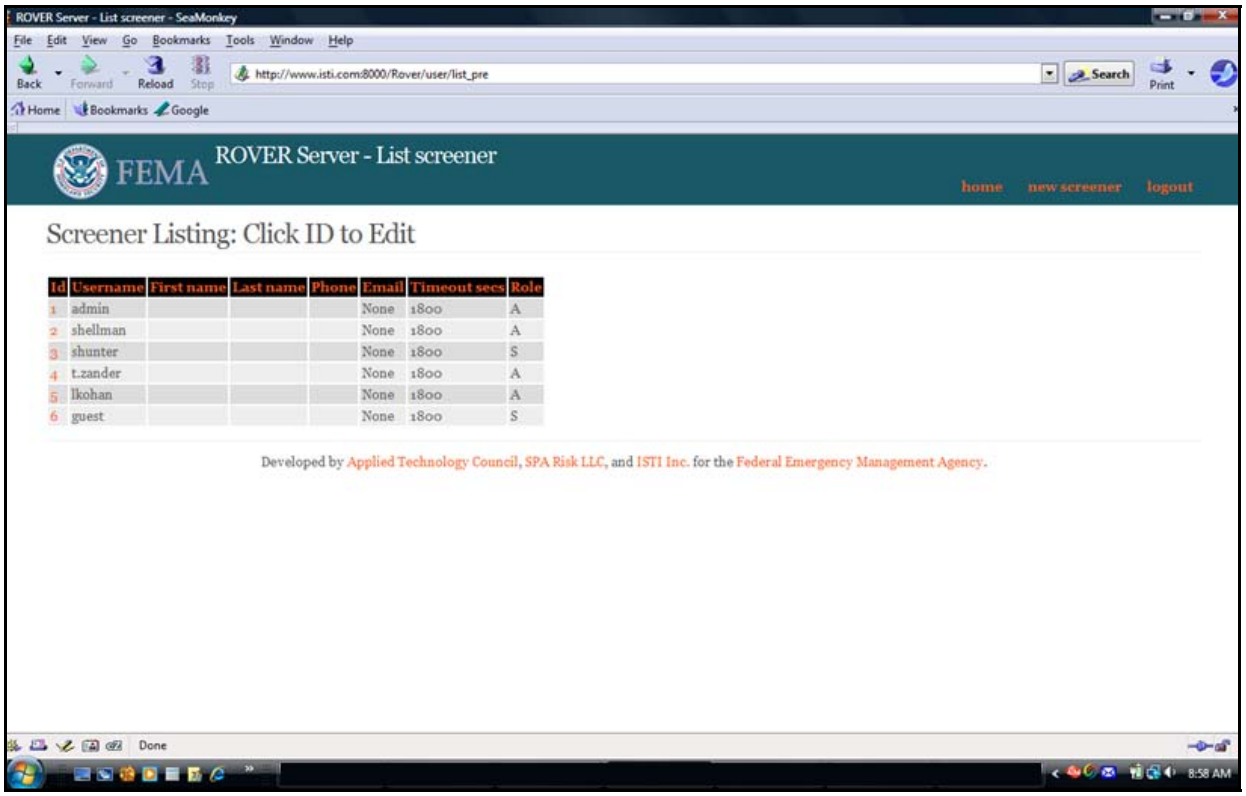
9.3.1.1.1 Add New Screener

In the main menu, click **Add New Screener in Sites**. In the worksheet that appears, enter information and click **Submit**. Note the **Role** field allows for the option to provide **Administrator** or **Named Screener** privileges.



9.3.1.1.2 View List of Current Screeners

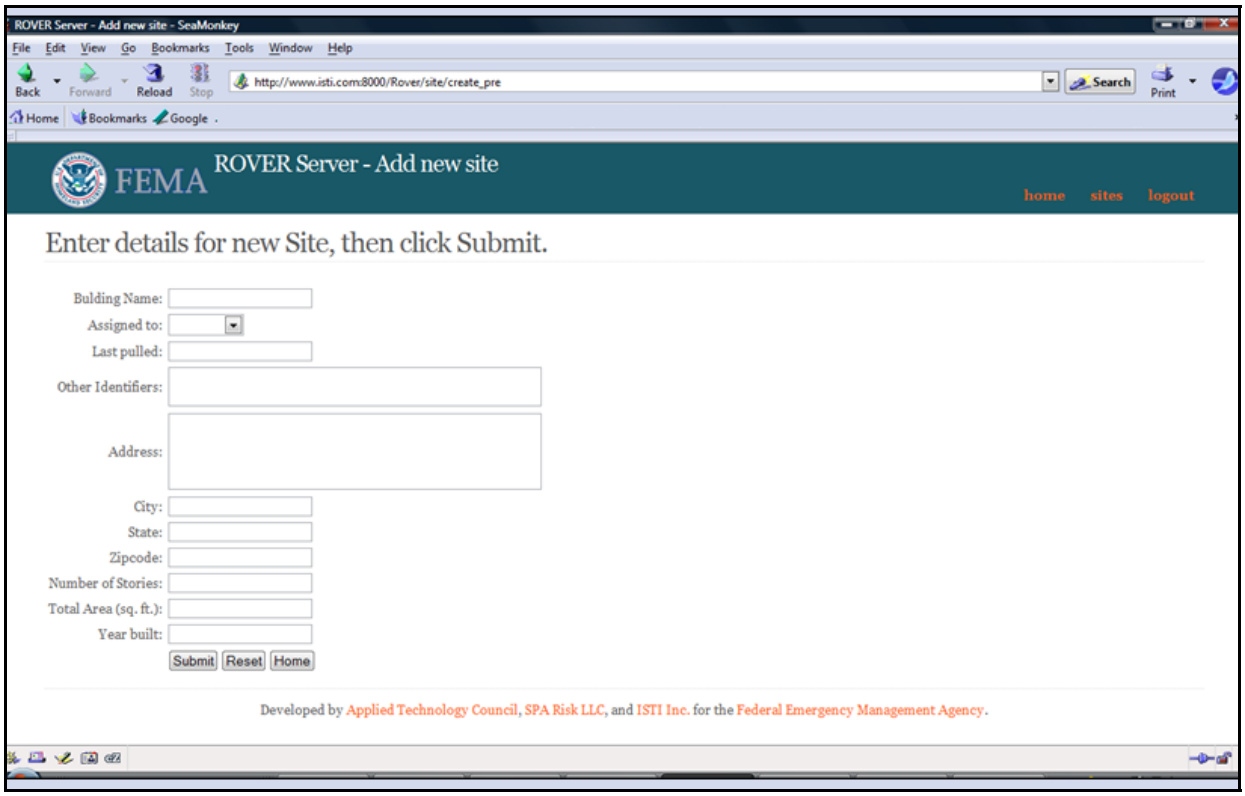
Clicking on **screeners** in this window or **View List of Current Screeners** from the main menu will list the active screeners.


ROVER Server - List screener - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/user/list_pre
Search
Print
Home Bookmarks Google
FEMA
ROVER Server - List screener
home new screener logout
Screener Listing: Click ID to Edit
Id Username First name Last name Phone Email Timeout secs Role
1 admin None 1800 A
2 shellman None 1800 A
3 shunter None 1800 S
4 t.zander None 1800 A
5 lkohan None 1800 A
6 guest None 1800 S
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
Done
8:58 AM

9.3.1.2 Menu Options for Sites

9.3.1.2.1 Add a New Site

In the main menu, click **Add New Site** under **Sites**. In the worksheet that appears, enter information and click **Submit**.



9.3.1.2.2 Assign a Screener to a Site

The assignment of a new site to a specific screener can be accomplished in 2 ways:

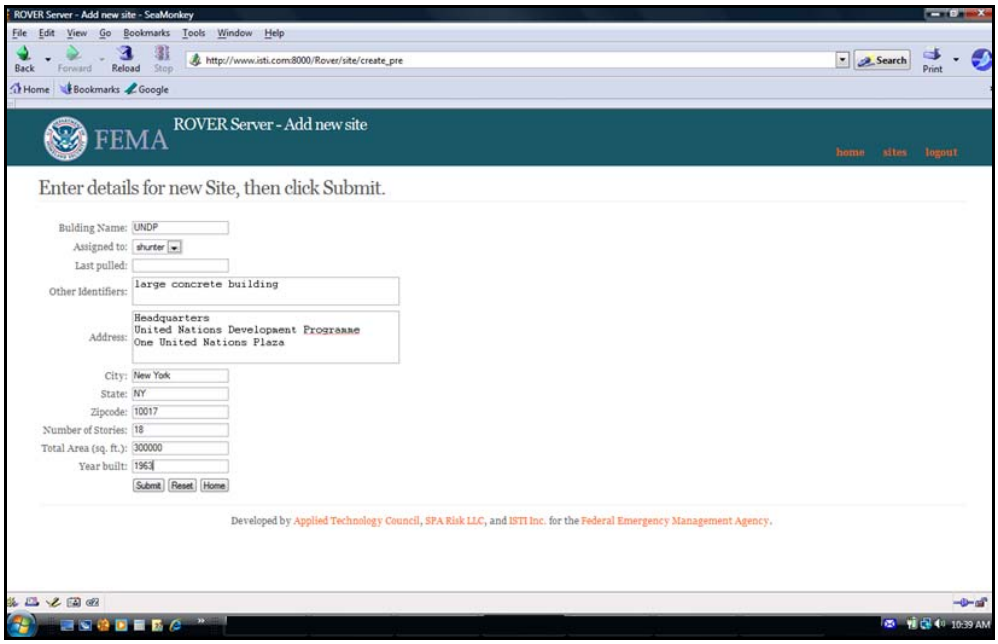
1. Use the pull-down menu in the "Assigned to" field of the New Site form and clicking submit.

2. Use the Site List screen and check the box next to the site to be assigned. Once checked, use the lower-left "Assign Site to" option to choose the screener.

During the synchronization process, all new or modified assignments from the server download to the appropriate clients (smartphone).

- In the previous screen (Add new site), the user has the ability to assign sites to specific screeners. For example, in the following screen, the site *UNDP* was created and originally assigned to "*shunter*".

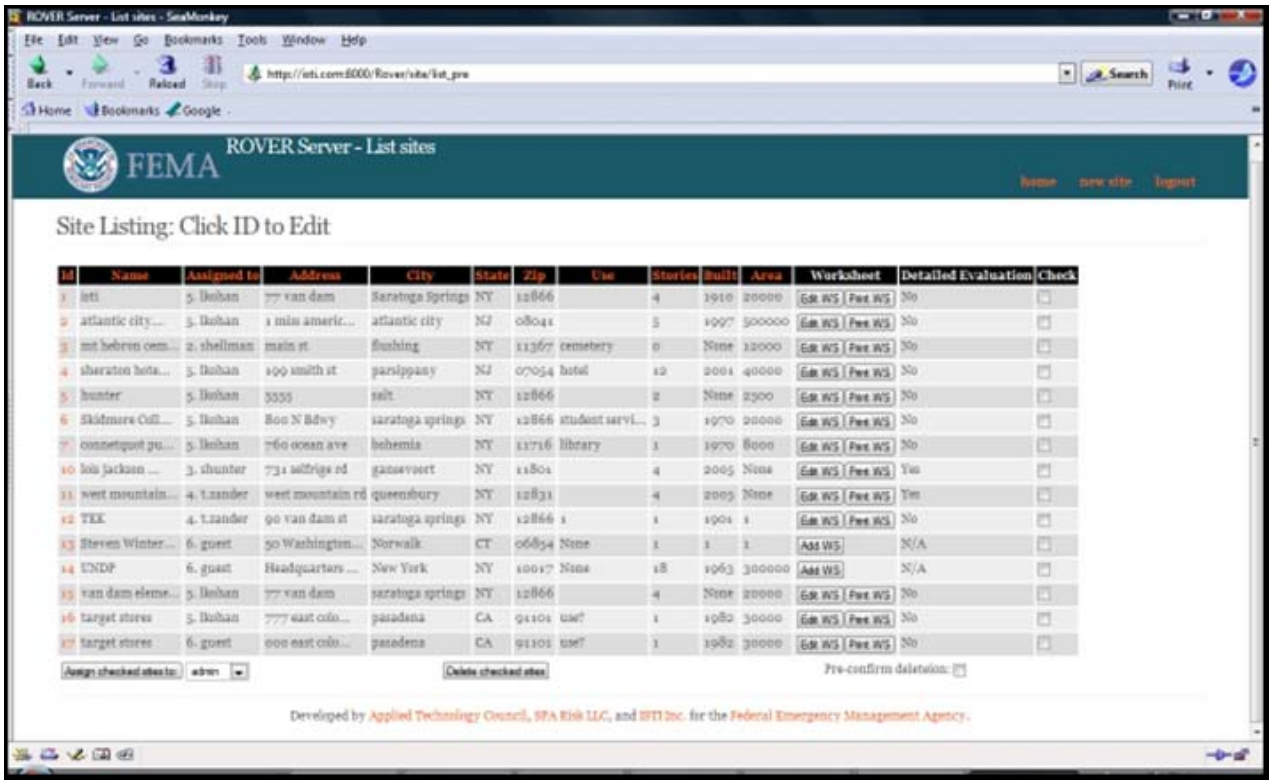
Note: The assignment of a site to a user can be modified either when modifying site information or when clicking on the **Edit WS** option in the Site List.


ROVER Server - Add new site - SeaMonkey
ROVER Server - Add new site
Enter details for new Site, then click Submit.
Bulding Name: UNDP
Assigned to: shunter
Last pulled:
Other Identifiers: large concrete building
Address: Headquarters
United Nations Development Programme
One United Nations Plaza
City: New York
State: NY
Zipcode: 10017
Number of Stories: 18
Total Area (sq. ft.): 300000
Year built: 1963
Submit
Reset
Home
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.

Screener assignments will be automatically updated during the next synchronization process with that screener's smartphone.

9.3.1.2.3 View List of Active Sites and Worksheets

- In the main menu, click on **View List of Active Sites and Worksheets**


ROVER Server - List sites - SeaMonkey
ROVER Server - List sites
Site Listing: Click ID to Edit
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.

- In this screen, the user has the ability to review, edit, sort or delete site information in the following manner:

    - In order to view/edit building information, click on the **ID** number on the leftmost column of the site to be viewed

    - In order to view, modify or print a particular worksheet, click on the site's corresponding **Edit WS** or **Print WS** option. This will navigate to the site's inspection details to date.

    - In order to sort information on a specific category, click on the column heading of the category. The default category is the **ID** column.

    - In order to delete a site, click on **Check** (the checkbox on the rightmost column) of the site to be deleted, click on **Pre-confirm delete** and click on **Delete checked sites.** Please note the following about the **Delete** sequence:

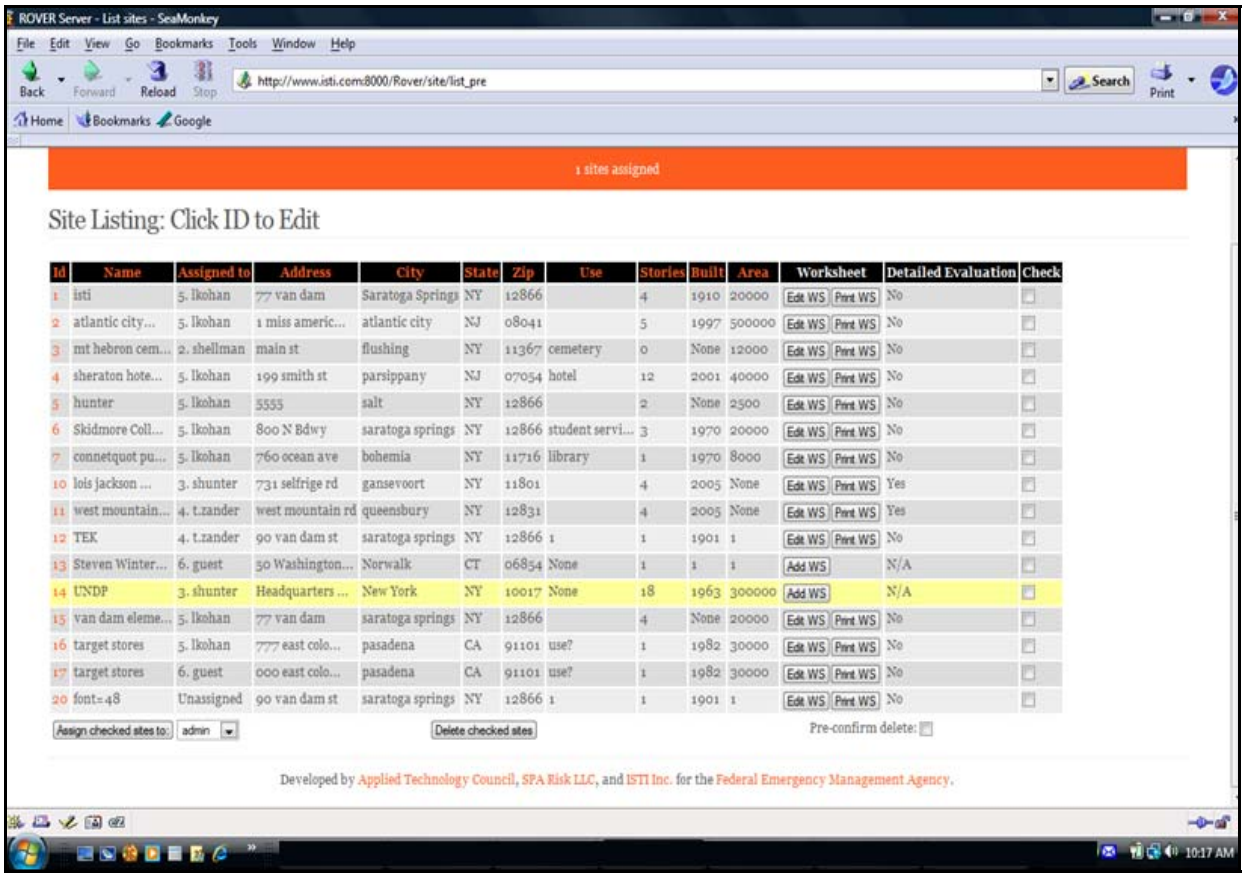
        - Sites will NOT be deleted unless the **Pre-confirm delete** box is clicked.

        - Once a site is deleted, the **ID** number will NOT get reused by another site and there will be a gap in **ID** numbers indicating the deletion of sites.

9.3.1.2.4 Assigning a User to a Site

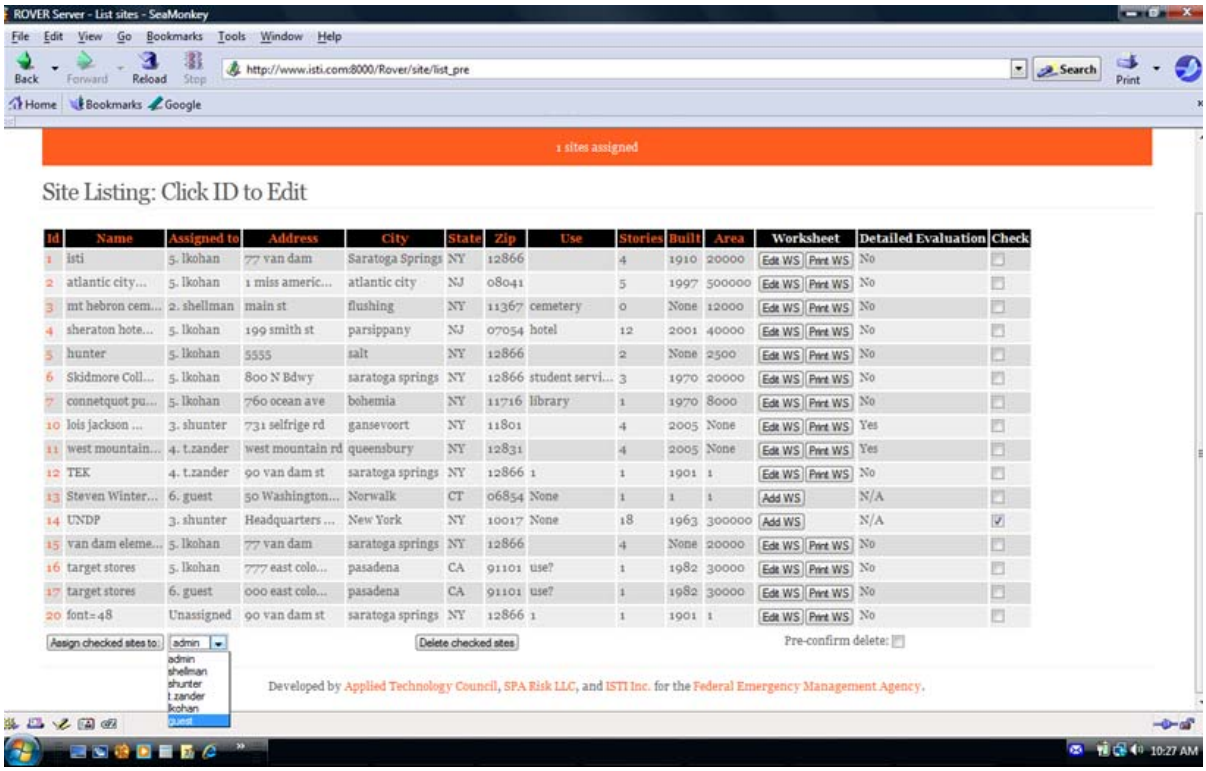
Note: The assignment of a new site to a specific user is accomplished by using the pull-down menu in the "assigned to" field of this form. During the synchronization process, all new or modified assignments from the server download to the appropriate clients (smartphone).

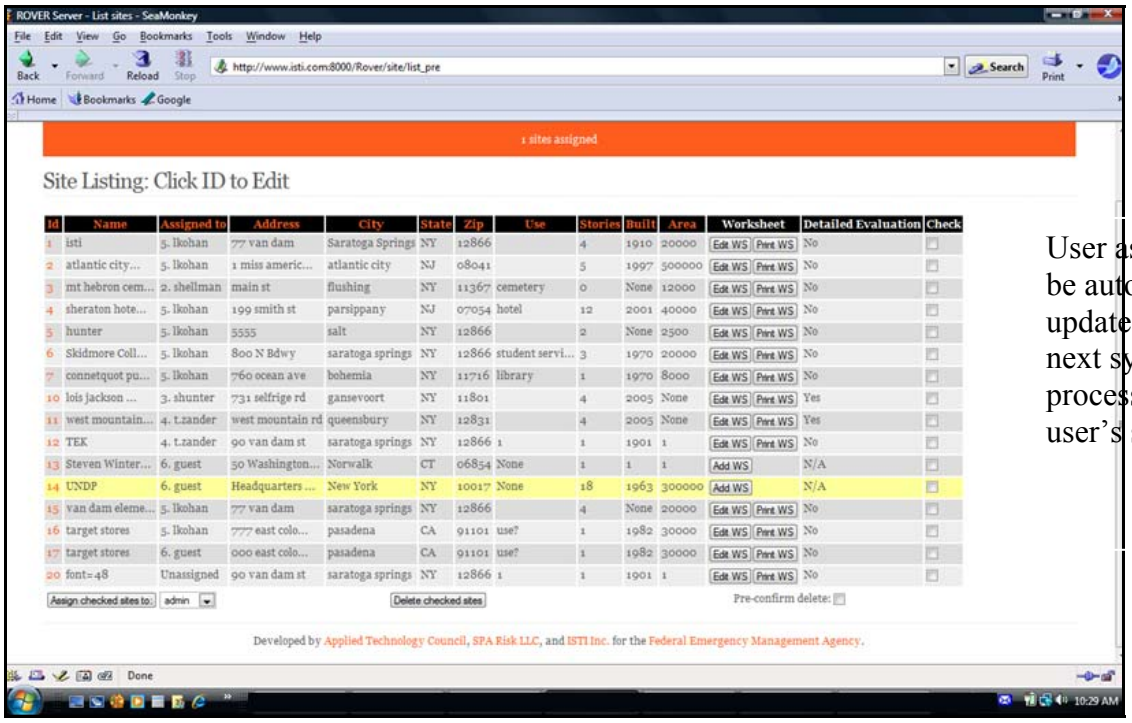
- In this screen, the user has the ability to assign sites to specific screeners. For example, in the following screen, the site *UNDP* was created and originally assigned to "*shunter*".


ROVER Server - List sites - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/site/list_pre
Search
Print
Home Bookmarks Google
1 sites assigned
Site Listing: Click ID to Edit
Id Name Assigned to Address City State Zip Use Stories Built Area Worksheet Detailed Evaluation Check
1 isti 5. lkohan 77 van dam Saratoga Springs NY 12866 4 1910 20000 Edit WS Print WS No
2 atlantic city... 5. lkohan 1 miss americ... atlantic city NJ 08041 5 1997 500000 Edit WS Print WS No
3 mt hebron cem... 2. shellman main st flushing NY 11367 cemetery 0 None 12000 Edit WS Print WS No
4 sheraton hote... 5. lkohan 199 smith st parsippany NJ 07054 hotel 12 2001 40000 Edit WS Print WS No
5 hunter 5. lkohan 5555 salt NY 12866 2 None 2500 Edit WS Print WS No
6 Skidmore Coll... 5. lkohan 800 N Bdwy saratoga springs NY 12866 student servi... 3 1970 20000 Edit WS Print WS No
7 connetquot pu... 5. lkohan 760 ocean ave bohemia NY 11716 library 1 1970 8000 Edit WS Print WS No
10 lois jackson ... 3. shunter 731 selfrige rd gansevoort NY 11801 4 2005 None Edit WS Print WS Yes
11 west mountain... 4. t.zander west mountain rd queensbury NY 12831 4 2005 None Edit WS Print WS Yes
12 TEK 4. t.zander 90 van dam st saratoga springs NY 12866 1 1 1901 1 Edit WS Print WS No
13 Steven Winter... 6. guest 50 Washington... Norwalk CT 06854 None 1 1 1 Add WS N/A
14 UNDP 3. shunter Headquarters ... New York NY 10017 None 18 1963 300000 Add WS N/A
15 van dam eleme... 5. lkohan 77 van dam saratoga springs NY 12866 4 None 20000 Edit WS Print WS No
16 target stores 5. lkohan 777 east colo... pasadena CA 91101 use? 1 1982 30000 Edit WS Print WS No
17 target stores 6. guest 000 east colo... pasadena CA 91101 use? 1 1982 30000 Edit WS Print WS No
20 font=48 Unassigned 90 van dam st saratoga springs NY 12866 1 1 1901 1 Edit WS Print WS No
Assign checked sites to: admin
Delete checked sites
Pre-confirm delete:
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
10:17 AM

- To change the assigned user for this site, click on the checkbox to the right of the site being assigned

- Choose the assigned user (guest) in the bottom left menu next to **Assign checked sites to:** button and click on it

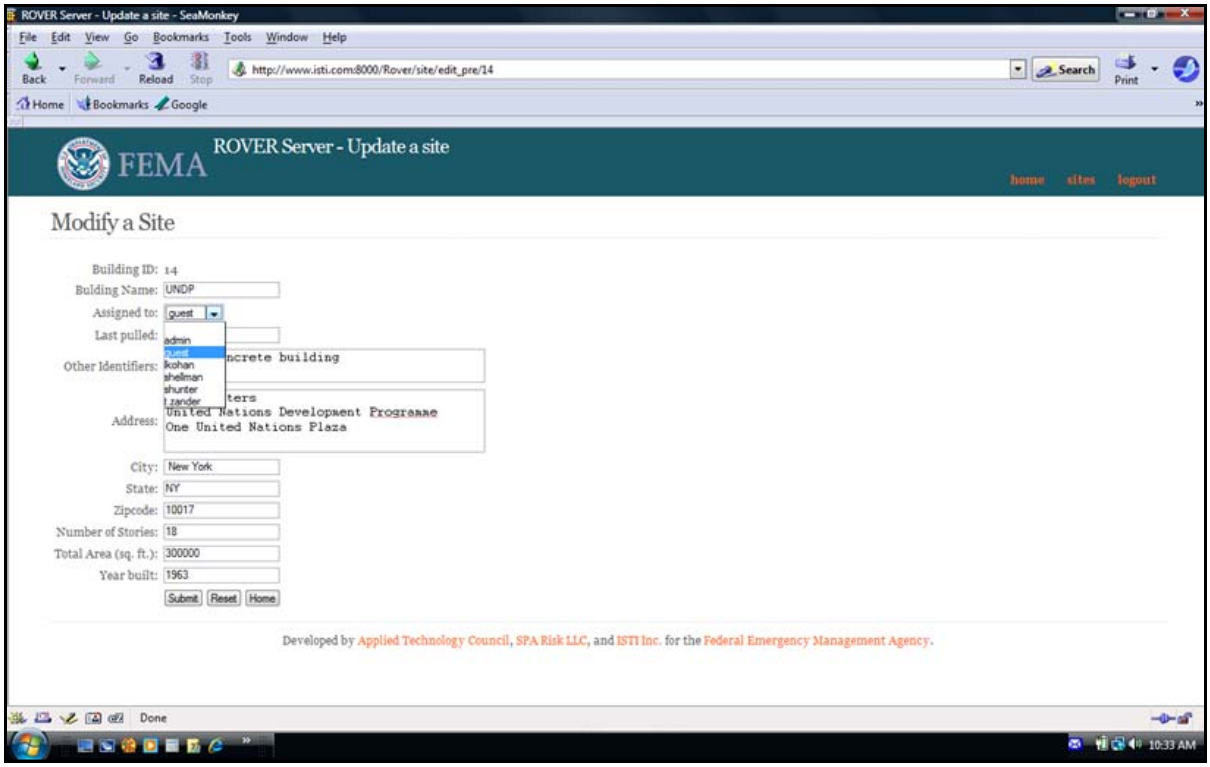

ROVER Server - List sites - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/site/list_pre
Search Print
Home Bookmarks Google
1 sites assigned
Site Listing: Click ID to Edit
Id Name Assigned to Address City State Zip Use Stories Built Area Worksheet Detailed Evaluation Check
1 isti 5. lkohan 77 van dam Saratoga Springs NY 12866 4 1910 20000 Edit WS Print WS No
2 atlantic city... 5. lkohan 1 miss americ... atlantic city NJ 08041 5 1997 500000 Edit WS Print WS No
3 mt hebron cem... 2. shellman main st flushing NY 11367 cemetery 0 None 12000 Edit WS Print WS No
4 sheraton hote... 5. lkohan 199 smith st parsippany NJ 07054 hotel 12 2001 40000 Edit WS Print WS No
5 hunter 5. lkohan 5555 salt NY 12866 2 None 2500 Edit WS Print WS No
6 Skidmore Coll... 5. lkohan 800 N Bdwy saratoga springs NY 12866 student servi... 3 1970 20000 Edit WS Print WS No
7 connetquot pu... 5. lkohan 760 ocean ave bohemia NY 11716 library 1 1970 8000 Edit WS Print WS No
10 lois jackson ... 3. shunter 731 selfrige rd gansevoort NY 11801 4 2005 None Edit WS Print WS Yes
11 west mountain... 4. t.zander west mountain rd queensbury NY 12831 4 2005 None Edit WS Print WS Yes
12 TEK 4. t.zander 90 van dam st saratoga springs NY 12866 1 1 1901 1 Edit WS Print WS No
13 Steven Winter... 6. guest 50 Washington... Norwalk CT 06854 None 1 1 1 Add WS N/A
14 UNDP 3. shunter Headquarters ... New York NY 10017 None 18 1963 300000 Add WS N/A
15 van dam eleme... 5. lkohan 77 van dam saratoga springs NY 12866 4 None 20000 Edit WS Print WS No
16 target stores 5. lkohan 7777 east colo... pasadena CA 91101 use? 1 1982 30000 Edit WS Print WS No
17 target stores 6. guest 000 east colo... pasadena CA 91101 use? 1 1982 30000 Edit WS Print WS No
20 font=48 Unassigned 90 van dam st saratoga springs NY 12866 1 1 1901 1 Edit WS Print WS No
Assign checked sites to: admin
Delete checked sites
Pre-confirm delete:
admin
shellman
shunter
t.zander
lkohan
guest
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
10:27 AM


ROVER Server - List sites - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/site/list_pre
Search Print
Home Bookmarks Google
1 sites assigned
Site Listing: Click ID to Edit
Id Name Assigned to Address City State Zip Use Stories Built Area Worksheet Detailed Evaluation Check
1 isti 5. lkohan 77 van dam Saratoga Springs NY 12866 4 1910 20000 Edit WS Print WS No
2 atlantic city... 5. lkohan 1 miss americ... atlantic city NJ 08041 5 1997 500000 Edit WS Print WS No
3 mt hebron cem... 2. shellman main st flushing NY 11367 cemetery 0 None 12000 Edit WS Print WS No
4 sheraton hote... 5. lkohan 199 smith st parsippany NJ 07054 hotel 12 2001 40000 Edit WS Print WS No
5 hunter 5. lkohan 5555 salt NY 12866 2 None 2500 Edit WS Print WS No
6 Skidmore Coll... 5. lkohan 800 N Bdwy saratoga springs NY 12866 student servi... 3 1970 20000 Edit WS Print WS No
7 connetquot pu... 5. lkohan 760 ocean ave bohemia NY 11716 library 1 1970 8000 Edit WS Print WS No
10 lois jackson ... 3. shunter 731 selfrige rd gansevoort NY 11801 4 2005 None Edit WS Print WS Yes
11 west mountain... 4. t.zander west mountain rd queensbury NY 12831 4 2005 None Edit WS Print WS Yes
12 TEK 4. t.zander 90 van dam st saratoga springs NY 12866 1 1 1901 1 Edit WS Print WS No
13 Steven Winter... 6. guest 50 Washington... Norwalk CT 06854 None 1 1 1 Add WS N/A
14 UNDP 6. guest Headquarters ... New York NY 10017 None 18 1963 300000 Add WS N/A
15 van dam eleme... 5. lkohan 77 van dam saratoga springs NY 12866 4 None 20000 Edit WS Print WS No
16 target stores 5. lkohan 7777 east colo... pasadena CA 91101 use? 1 1982 30000 Edit WS Print WS No
17 target stores 6. guest 000 east colo... pasadena CA 91101 use? 1 1982 30000 Edit WS Print WS No
20 font=48 Unassigned 90 van dam st saratoga springs NY 12866 1 1 1901 1 Edit WS Print WS No
Assign checked sites to: admin
Delete checked sites
Pre-confirm delete:
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
Done
10:29 AM

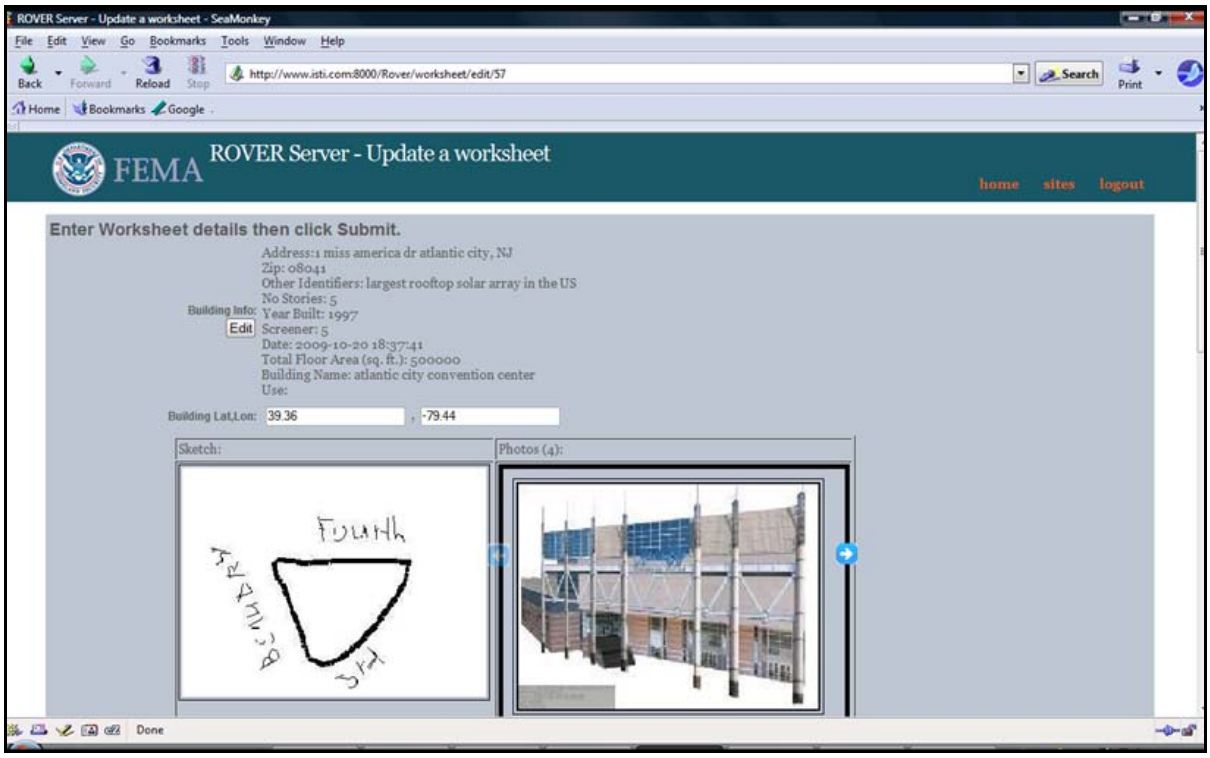
User assignments will be automatically updated during the next synchronization process with that user's smartphone.

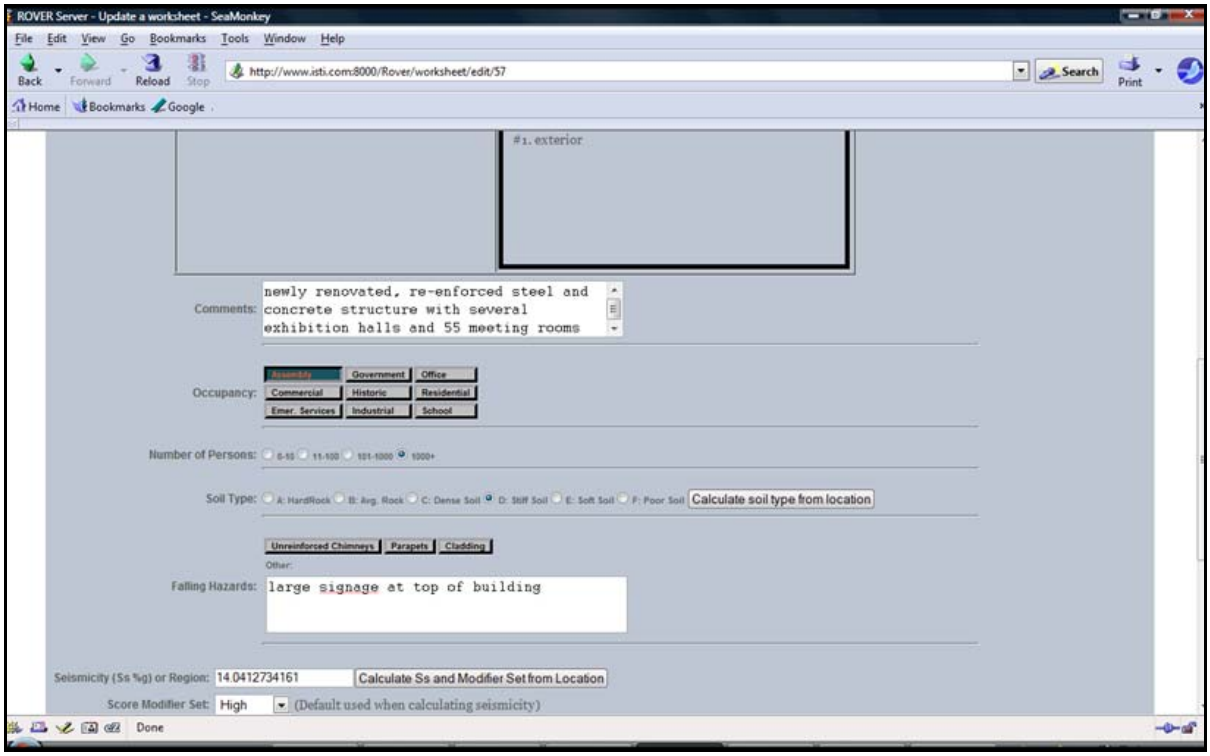
- Alternatively, the user assignment (or other building information) can be modified by clicking on the ID number of the site which will navigate to the following screen and allow the user to change assignments as shown. In order

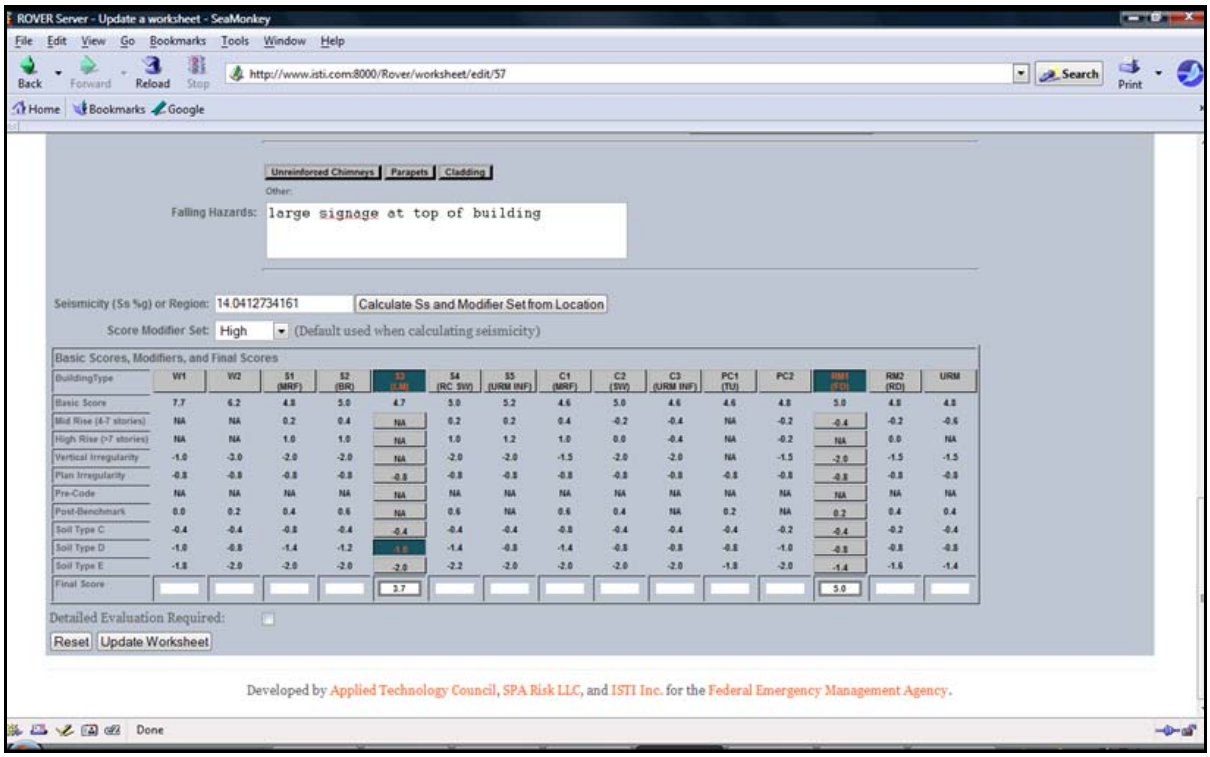
to effect any changes in **Modify a Site** screen, the **Submit** button must be clicked.



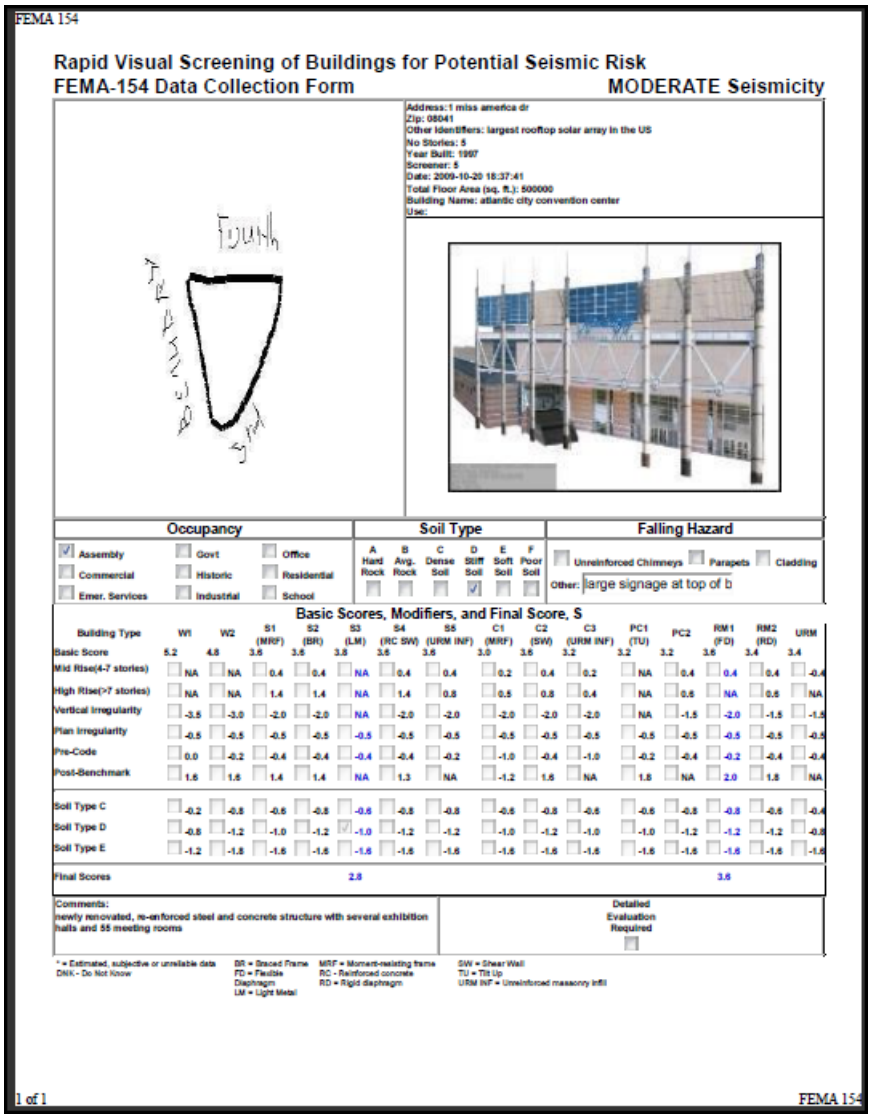
- Click on any site to view/edit the worksheet (*Atlantic City Convention Center* was chosen for this example). Edit the necessary information and click **Update Worksheet**. Clicking **Reset** will return the worksheet to its previous settings. Click **sites** to go back to the site listing screen.


ROVER Server - Update a worksheet - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/worksheet/edit/57
Search
Print
Home Bookmarks Google
FEMA
ROVER Server - Update a worksheet
home sites logout
Enter Worksheet details then click Submit.
Address:1 miss america dr atlantic city, NJ
Zip: 08041
Other Identifiers: largest rooftop solar array in the US
No Stories: 5
Building Info:
Year Built: 1997
Edit
Screener: 5
Date: 2009-10-20 18:37:41
Total Floor Area (sq. ft.): 500000
Building Name: atlantic city convention center
Use:
Building Lat,Lon: 39.36 , -79.44
Sketch:
Photos (4):
Done


ROVER Server - Update a worksheet - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/worksheet/edit/57
Search
Print
Home Bookmarks Google
#1. exterior
Comments:
newly renovated, re-enforced steel and
concrete structure with several
exhibition halls and 55 meeting rooms
Occupancy:
Assembly
Government
Office
Commercial
Historic
Residential
Emer. Services
Industrial
School
Number of Persons:
Soil Type:
Calculate soil type from location
Unreinforced Chimneys
Parapets
Cladding
Other:
Falling Hazards:
large signage at top of building
Seismicity (Ss %g) or Region: 14.0412734161
Calculate Ss and Modifier Set from Location
Score Modifier Set: High
(Default used when calculating seismicity)
Done



- To print the worksheet, go back to the **Site Listing** screen, click on **Print WS** for *Atlantic City Convention Center*. This displays a printable FEMA 154 worksheet.



FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk
FEMA-154 Data Collection Form MODERATE Seismicity

Address:1 miss america dr
Zip: 08041
Other Identifiers: largest rooftop solar array in the US
No Stories: 5
Year Built: 1997
Screener: 5
Date: 2009-10-20 18:37:41
Total Floor Area (sq. ft.): 500000
Building Name: atlantic city convention center
Use:

Occupancy: Assembly, Commercial, Emer. Services, Govt, Historic, Industrial, Office, Residential, School

Soil Type: A Hard Rock, B Avg. Rock, C Dense Soil, D Stiff Soil, E Soft Soil, F Poor Soil

Falling Hazard: Unreinforced Chimneys, Parapets, Cladding; Other: large signage at top of b

Basic Scores, Modifiers, and Final Score, S

Building Type	W1	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM
Basic Score	5.2	4.8	3.6	3.6	3.8	3.6	3.6	3.0	3.6	3.2	3.2	3.2	3.6	3.4	3.4
Mid Rise(4-7 stories)	NA	NA	0.4	0.4	NA	0.4	0.4	0.2	0.4	0.2	NA	0.4	0.4	0.4	-0.4
High Rise(>7 stories)	NA	NA	1.4	1.4	NA	1.4	0.8	0.5	0.8	0.4	NA	0.6	NA	0.6	NA
Vertical Irregularity	-3.5	-3.0	-2.0	-2.0	NA	-2.0	-2.0	-2.0	-2.0	-2.0	NA	-1.5	-2.0	-1.5	-1.5
Plan Irregularity	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Pre-Code	0.0	-0.2	-0.4	-0.4	-0.4	-0.4	-0.2	-1.0	-0.4	-1.0	-0.2	-0.4	-0.2	-0.4	-0.4
Post-Benchmark	1.6	1.6	1.4	1.4	NA	1.3	NA	-1.2	1.6	NA	1.6	NA	2.0	1.6	NA
Soil Type C	-0.2	-0.8	-0.6	-0.8	-0.6	-0.8	-0.8	-0.6	-0.8	-0.6	-0.6	-0.8	-0.8	-0.6	-0.4
Soil Type D	-0.8	-1.2	-1.0	-1.2	-1.0	-1.2	-1.2	-1.0	-1.2	-1.0	-1.0	-1.2	-1.2	-1.2	-0.8
Soil Type E	-1.2	-1.8	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6
Final Scores			2.8										3.6		

Comments: newly renovated, re-enforced steel and concrete structure with several exhibition halls and 55 meeting rooms

Detailed Evaluation Required

* = Estimated, subjective or unreliable data
DNK - Do Not Know
BR = Braced Frame, FD = Flexible Diaphragm, LM = Light Metal
MRF = Moment-resisting frame, RC - Reinforced concrete, RD = Rigid diaphragm
SW = Shear Wall, TU = Tilt Up, URM INF = Unreinforced masonry infill

1 of 1 FEMA 154

9.3.1.2.5 Merge Field Data Utility

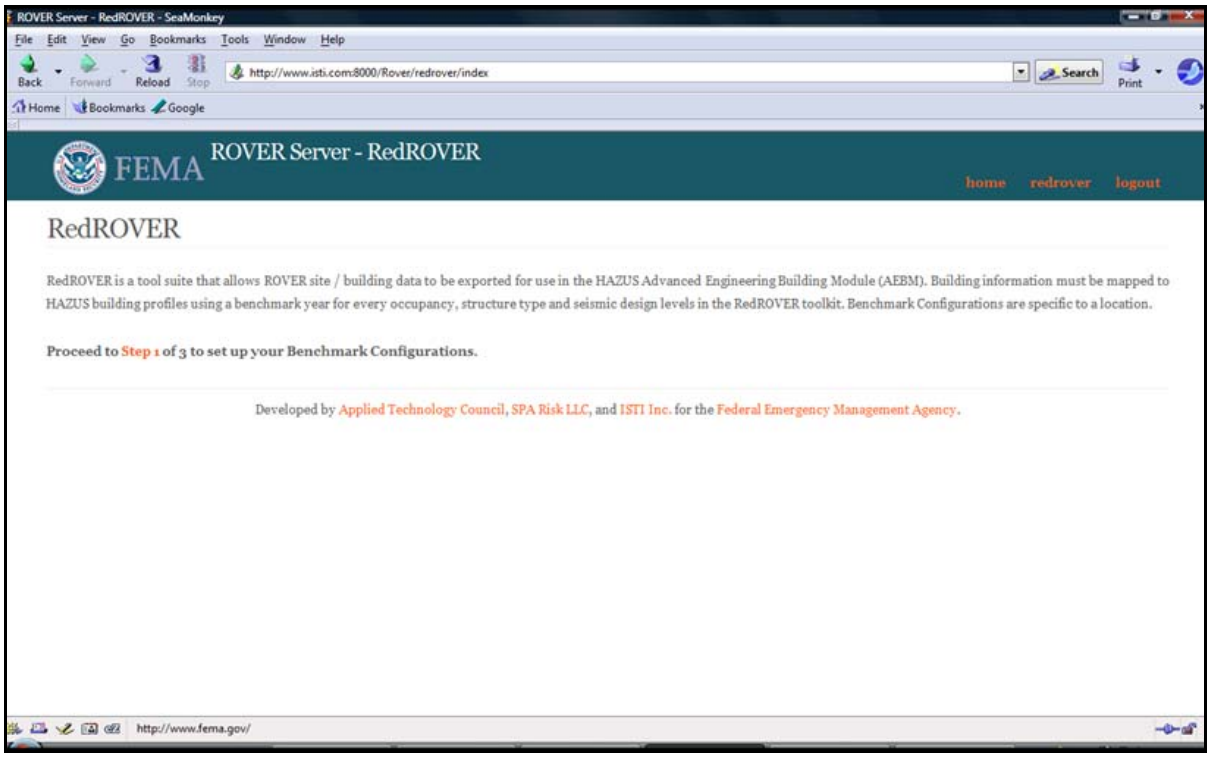
This feature is currently under testing and will be available soon.

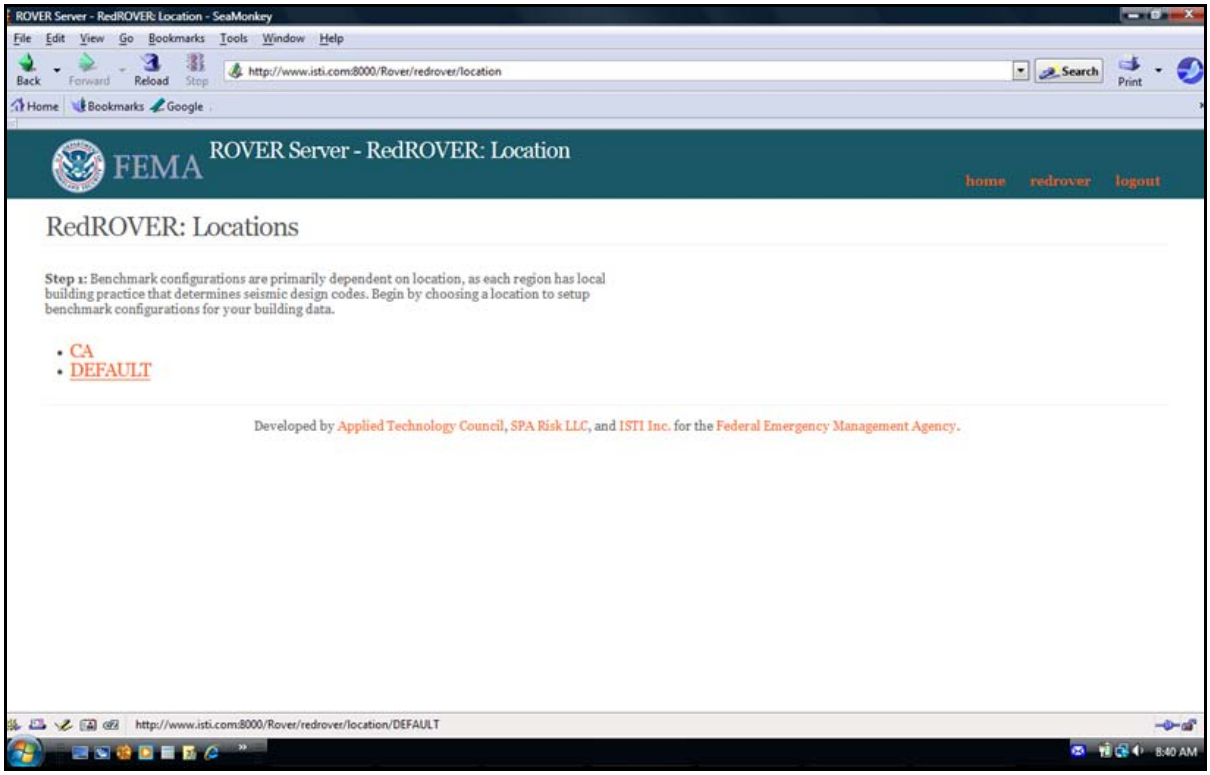
9.3.2 RedROVER

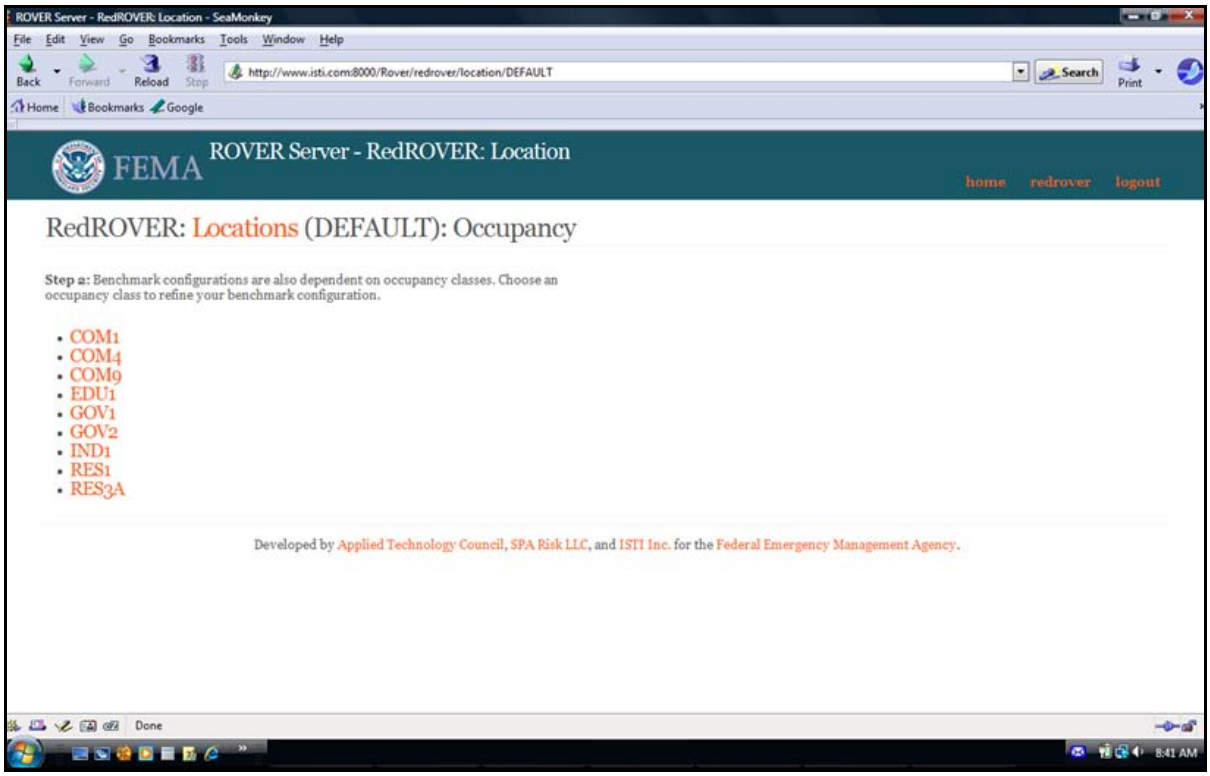
RedROVER is feature of the ROVER Server for exporting building data for analysis with HAZUS-MH Advanced Engineering Building Module (AEBM).

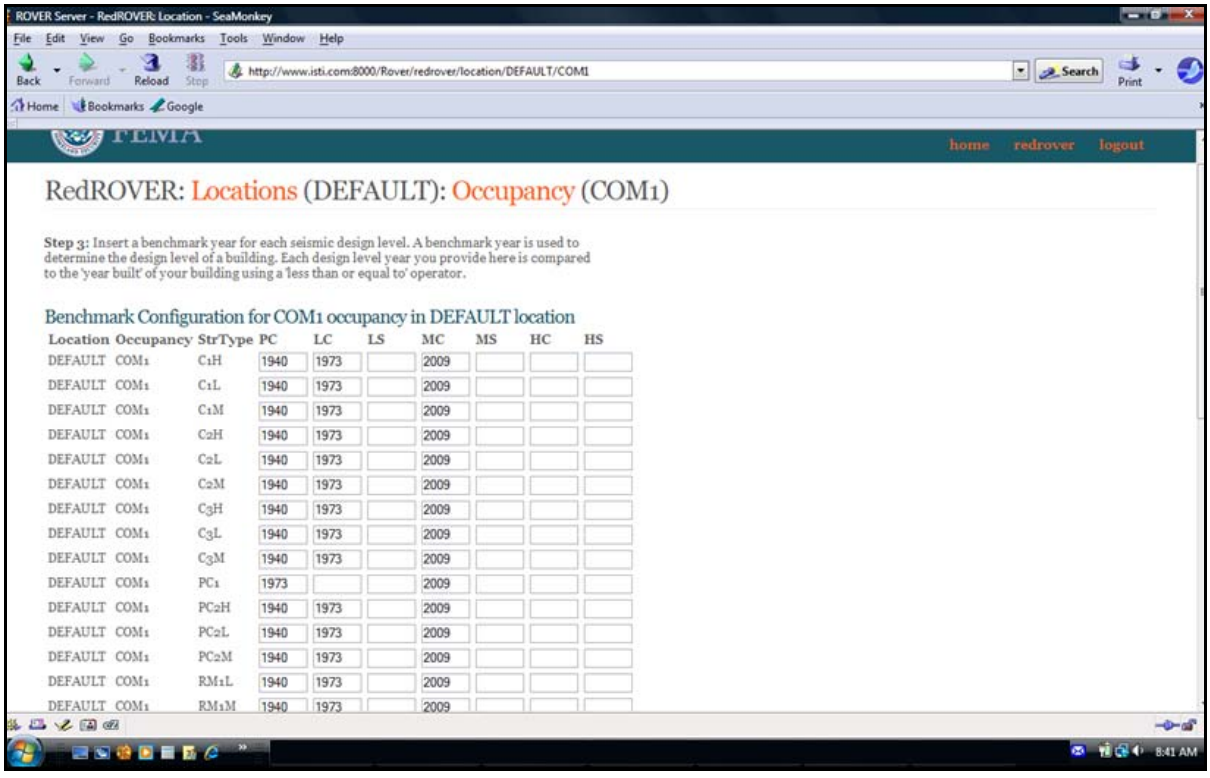
9.3.2.1 Menu Options for RedROVER

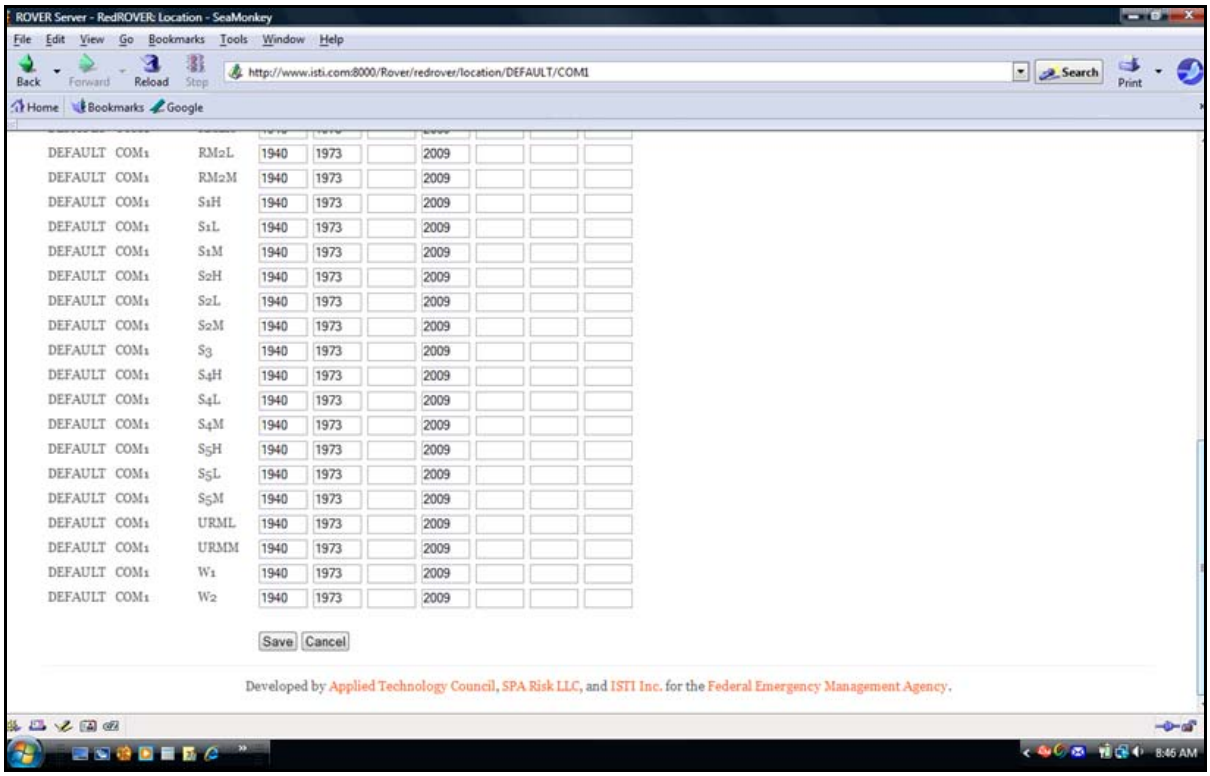
- In the main menu, click on **Configure**. Follow the instructions in Steps 1 – 3 to configure default benchmark years (i.e., years in which the building code substantially improved design requirements.)

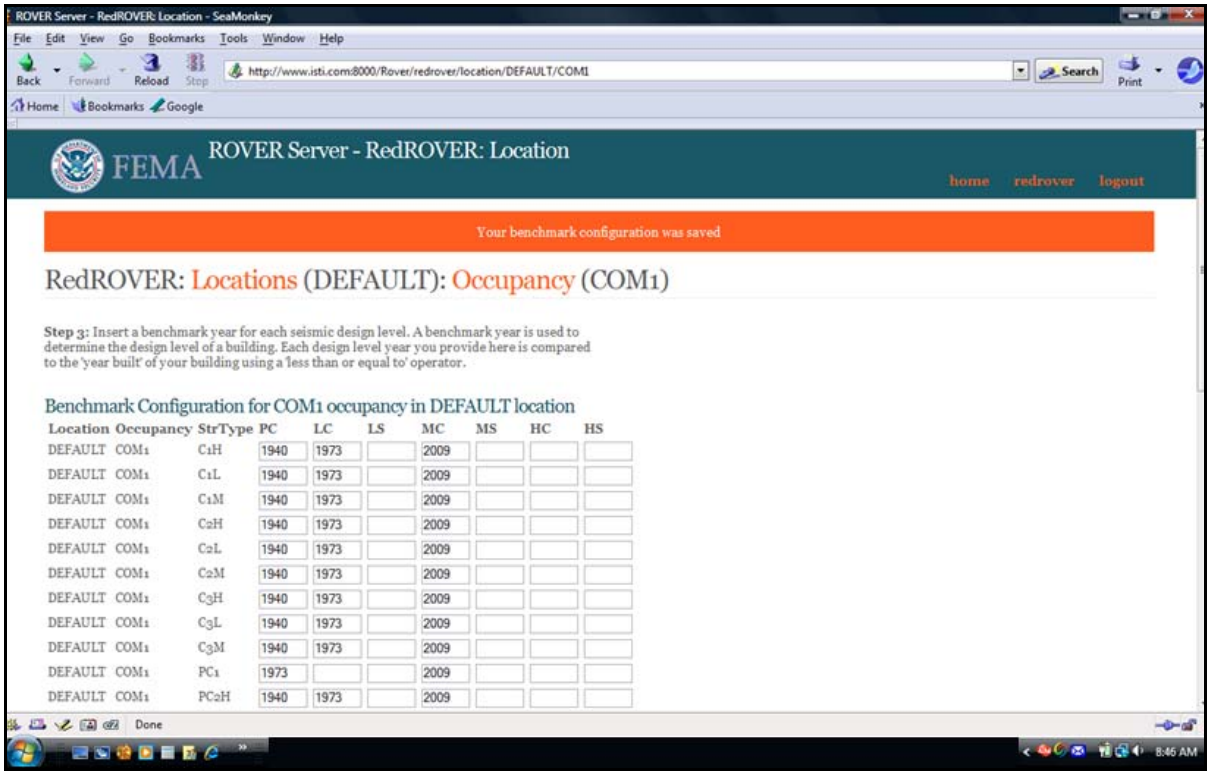

ROVER Server - RedROVER - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/redrover/index
Search Print
Home Bookmarks Google
FEMA
ROVER Server - RedROVER
home redrover logout
RedROVER
RedROVER is a tool suite that allows ROVER site / building data to be exported for use in the HAZUS Advanced Engineering Building Module (AEBM). Building information must be mapped to HAZUS building profiles using a benchmark year for every occupancy, structure type and seismic design levels in the RedROVER toolkit. Benchmark Configurations are specific to a location.
Proceed to Step 1 of 3 to set up your Benchmark Configurations.
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
http://www.fema.gov/


ROVER Server - RedROVER: Location - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/redrover/location
Search Print
Home Bookmarks Google
FEMA
ROVER Server - RedROVER: Location
home redrover logout
RedROVER: Locations
Step 1: Benchmark configurations are primarily dependent on location, as each region has local building practice that determines seismic design codes. Begin by choosing a location to setup benchmark configurations for your building data.
CA
DEFAULT
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
http://www.isti.com:8000/Rover/redrover/location/DEFAULT
8:40 AM


ROVER Server - RedROVER: Location - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/redrover/location/DEFAULT
Search Print
Home Bookmarks Google
FEMA
ROVER Server - RedROVER: Location
home redrover logout
RedROVER: Locations (DEFAULT): Occupancy
Step 2: Benchmark configurations are also dependent on occupancy classes. Choose an occupancy class to refine your benchmark configuration.
COM1
COM4
COM9
EDU1
GOV1
GOV2
IND1
RES1
RES3A
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
Done
8:41 AM

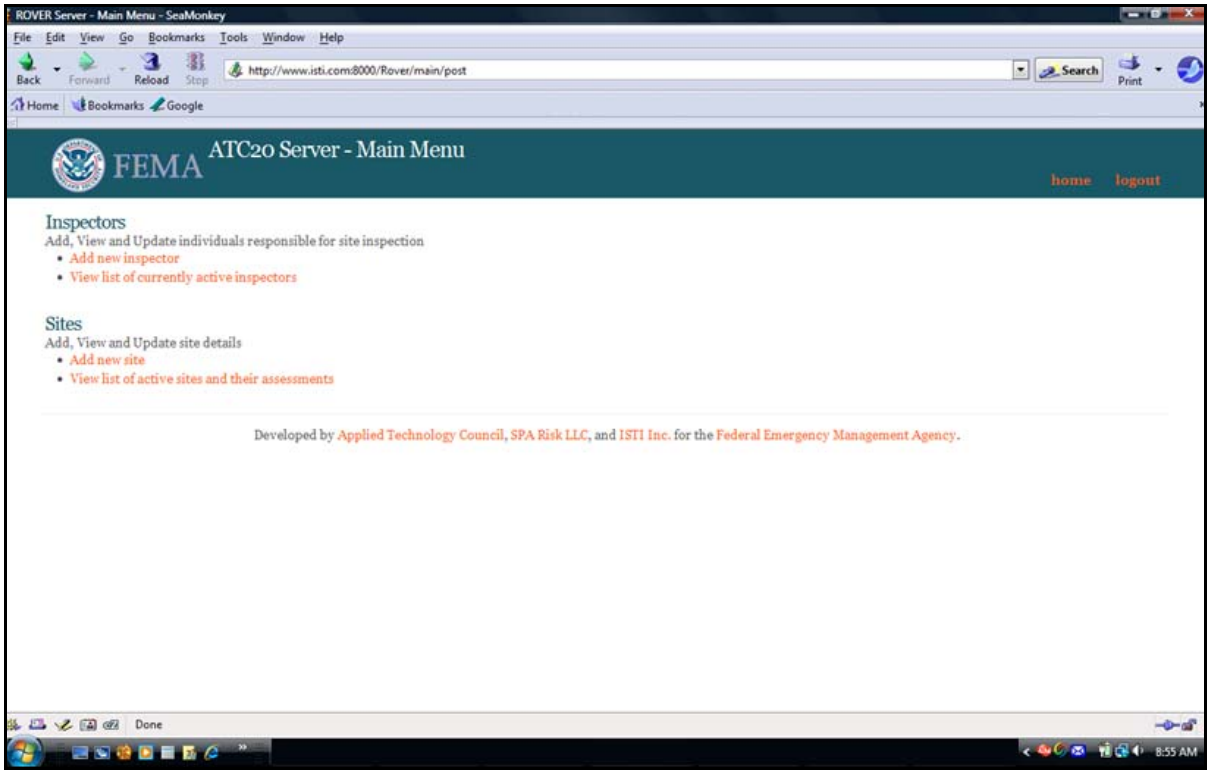

ROVER Server - RedROVER: Location - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/redrover/location/DEFAULT/COM1
Search Print
Home Bookmarks Google
home redrover logout
RedROVER: Locations (DEFAULT): Occupancy (COM1)
Step 3: Insert a benchmark year for each seismic design level. A benchmark year is used to determine the design level of a building. Each design level year you provide here is compared to the 'year built' of your building using a 'less than or equal to' operator.
Benchmark Configuration for COM1 occupancy in DEFAULT location
Location Occupancy StrType PC LC LS MC MS HC HS
DEFAULT COM1 C1H 1940 1973 2009
DEFAULT COM1 C1L 1940 1973 2009
DEFAULT COM1 C1M 1940 1973 2009
DEFAULT COM1 C2H 1940 1973 2009
DEFAULT COM1 C2L 1940 1973 2009
DEFAULT COM1 C2M 1940 1973 2009
DEFAULT COM1 C3H 1940 1973 2009
DEFAULT COM1 C3L 1940 1973 2009
DEFAULT COM1 C3M 1940 1973 2009
DEFAULT COM1 PC1 1973 2009
DEFAULT COM1 PC2H 1940 1973 2009
DEFAULT COM1 PC2L 1940 1973 2009
DEFAULT COM1 PC2M 1940 1973 2009
DEFAULT COM1 RM1L 1940 1973 2009
DEFAULT COM1 RM1M 1940 1973 2009
8:41 AM


ROVER Server - RedROVER: Location - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/redrover/location/DEFAULT/COM1
Search Print
Home Bookmarks Google
DEFAULT COM1 RM2L 1940 1973 2009
DEFAULT COM1 RM2M 1940 1973 2009
DEFAULT COM1 S1H 1940 1973 2009
DEFAULT COM1 S1L 1940 1973 2009
DEFAULT COM1 S1M 1940 1973 2009
DEFAULT COM1 S2H 1940 1973 2009
DEFAULT COM1 S2L 1940 1973 2009
DEFAULT COM1 S2M 1940 1973 2009
DEFAULT COM1 S3 1940 1973 2009
DEFAULT COM1 S4H 1940 1973 2009
DEFAULT COM1 S4L 1940 1973 2009
DEFAULT COM1 S4M 1940 1973 2009
DEFAULT COM1 S5H 1940 1973 2009
DEFAULT COM1 S5L 1940 1973 2009
DEFAULT COM1 S5M 1940 1973 2009
DEFAULT COM1 URML 1940 1973 2009
DEFAULT COM1 URMM 1940 1973 2009
DEFAULT COM1 W1 1940 1973 2009
DEFAULT COM1 W2 1940 1973 2009
Save Cancel
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
8:46 AM


ROVER Server - RedROVER: Location - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/redrover/location/DEFAULT/COM1
Search Print
Home Bookmarks Google
FEMA ROVER Server - RedROVER: Location
home redrover logout
Your benchmark configuration was saved
RedROVER: Locations (DEFAULT): Occupancy (COM1)
Step 3: Insert a benchmark year for each seismic design level. A benchmark year is used to determine the design level of a building. Each design level year you provide here is compared to the 'year built' of your building using a 'less than or equal to' operator.
Benchmark Configuration for COM1 occupancy in DEFAULT location
Location Occupancy StrType PC LC LS MC MS HC HS
DEFAULT COM1 C1H 1940 1973 2009
DEFAULT COM1 C1L 1940 1973 2009
DEFAULT COM1 C1M 1940 1973 2009
DEFAULT COM1 C2H 1940 1973 2009
DEFAULT COM1 C2L 1940 1973 2009
DEFAULT COM1 C2M 1940 1973 2009
DEFAULT COM1 C3H 1940 1973 2009
DEFAULT COM1 C3L 1940 1973 2009
DEFAULT COM1 C3M 1940 1973 2009
DEFAULT COM1 PC1 1973 2009
DEFAULT COM1 PC2H 1940 1973 2009
Done
8:46 AM

9.3.3 The ATC-20 (Post-Earthquake) Module:

- In the ROVER/ATC-20 Server - System Selection screen, click on **ATC-20 (Post-Earthquake)**


ROVER Server - Main Menu - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/main/post
Search
Print
Home Bookmarks Google
FEMA
ATC20 Server - Main Menu
home logout
Inspectors
Add, View and Update individuals responsible for site inspection
Add new inspector
View list of currently active inspectors
Sites
Add, View and Update site details
Add new site
View list of active sites and their assessments
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
Done
8:55 AM

9.3.3.1 Menu Options for Screeners

9.3.3.1.1 Add New Screener

This feature is identical to the feature in FEMA 154 module. Please refer Section 9.2.1.1.1.

9.3.3.1.2 View List of Current Screeners

This tool is identical to that in the FEMA 154 module. Please refer Section 9.2.1.1.2.

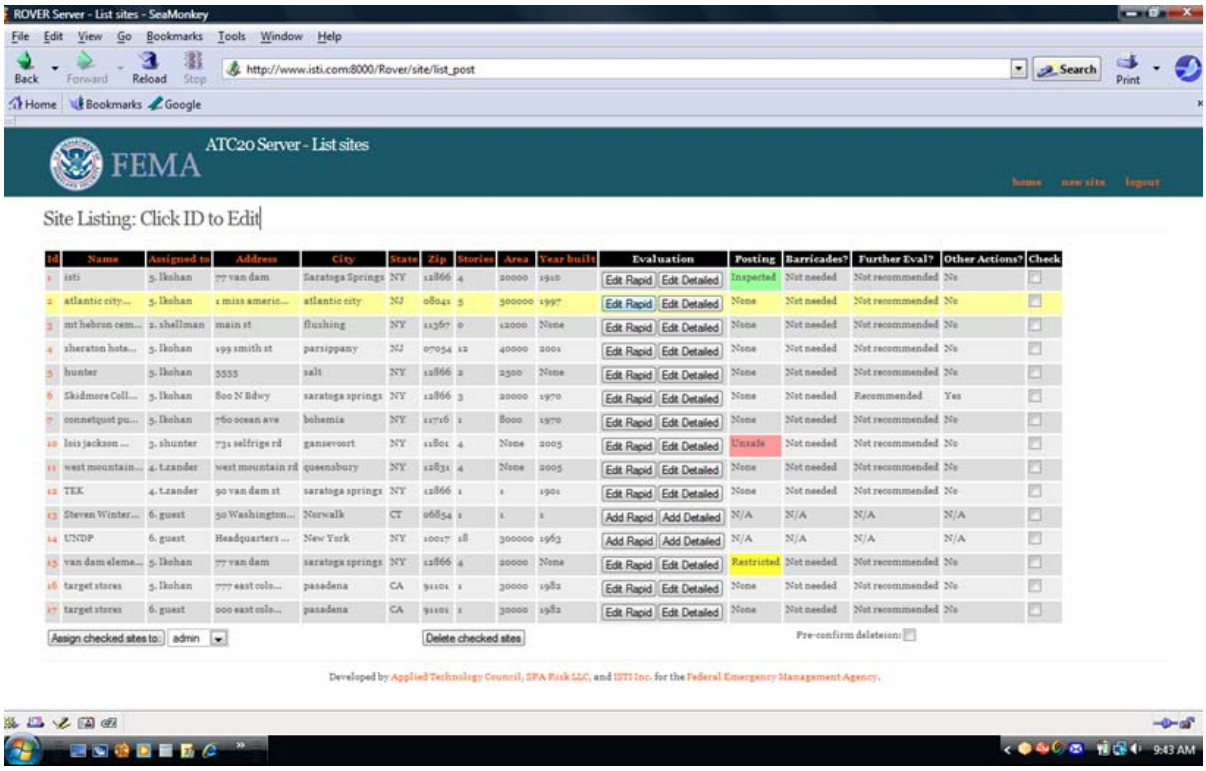
9.3.3.2 Menu Options for Sites

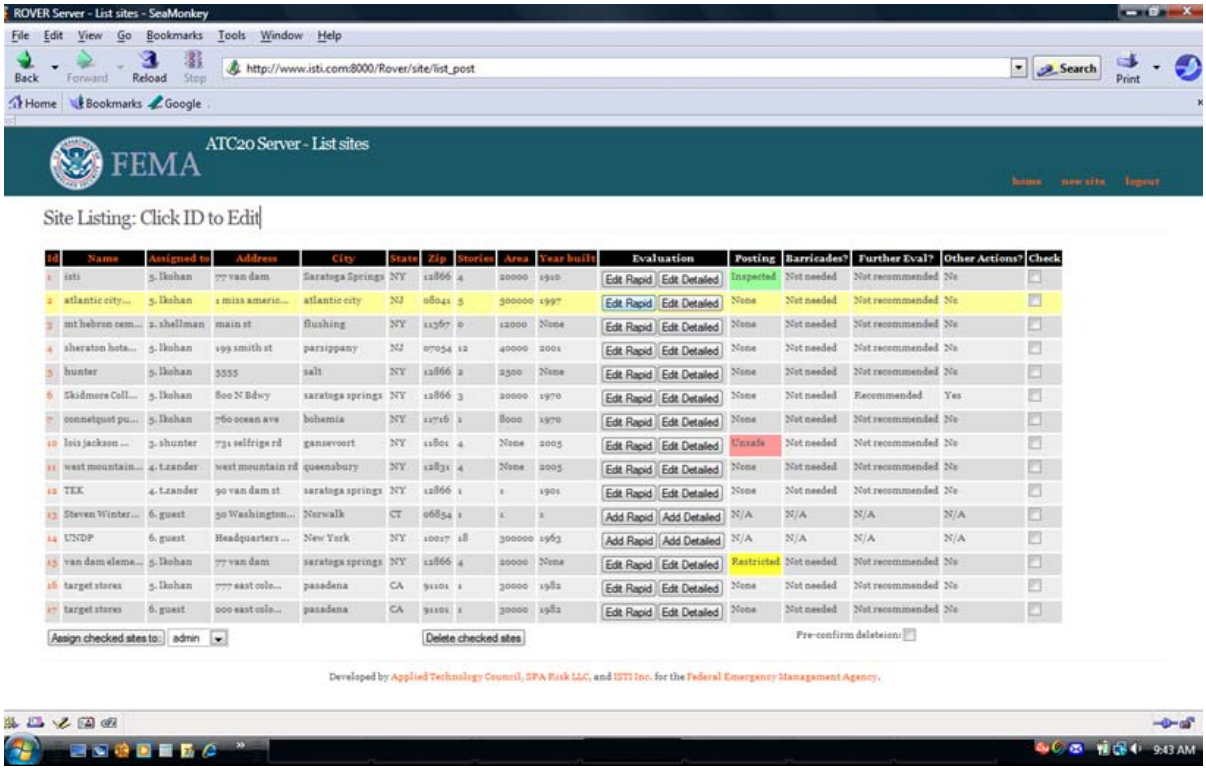
9.3.3.2.1 Add a New Site

This tool is identical to that in the FEMA 154 module. Please refer Section 9.2.1.1.2 for more information.

9.3.3.2.2 View List of Active Sites and Worksheets

- In the main menu, click on **View List of Active Sites and Worksheets**


ROVER Server - List sites - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/site/list_post
Search Print
Home Bookmarks Google
FEMA
ATC20 Server - List sites
home new site logout
Site Listing: Click ID to Edit
Assign checked sites to: admin
Delete checked sites
Pre-confirm deletion:
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
9:43 AM


ROVER Server - List sites - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/site/list_post
Search Print
Home Bookmarks Google
FEMA
ATC20 Server - List sites
home new site logout
Site Listing: Click ID to Edit
Assign checked sites to: admin
Delete checked sites
Pre-confirm deletion:
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
9:43 AM

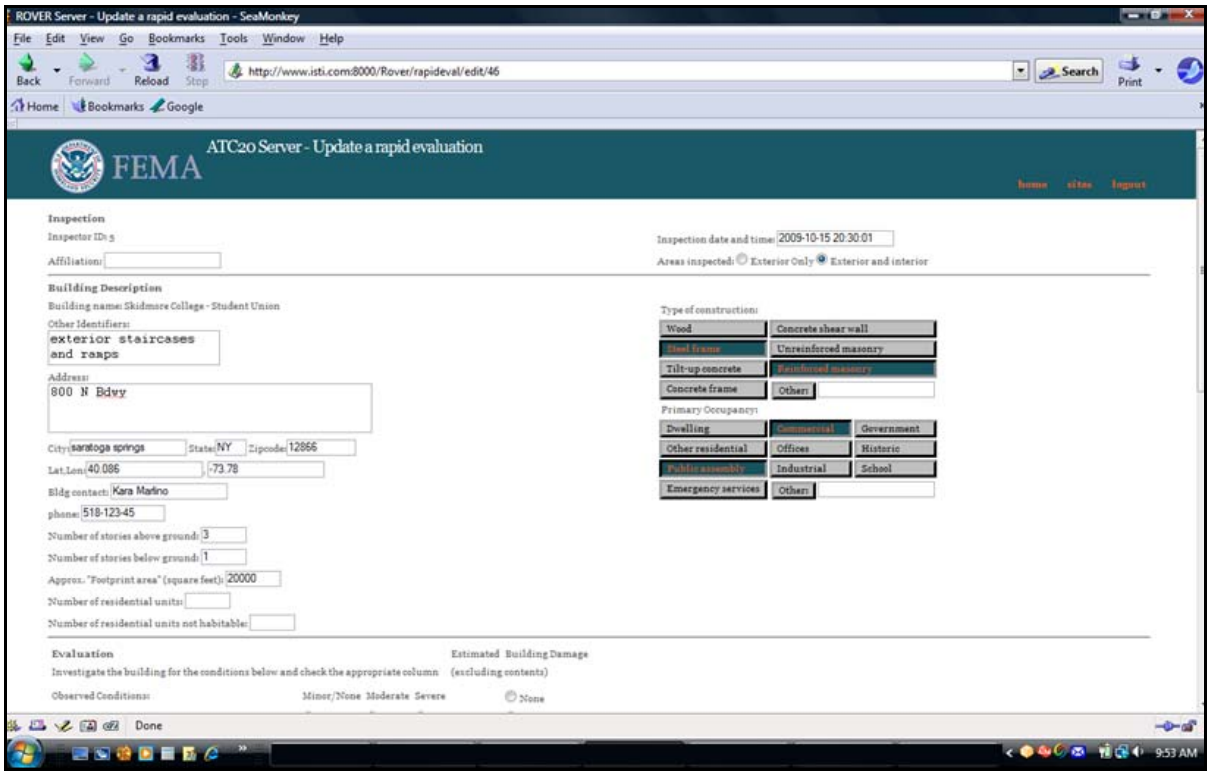
Edit Rapid Option:

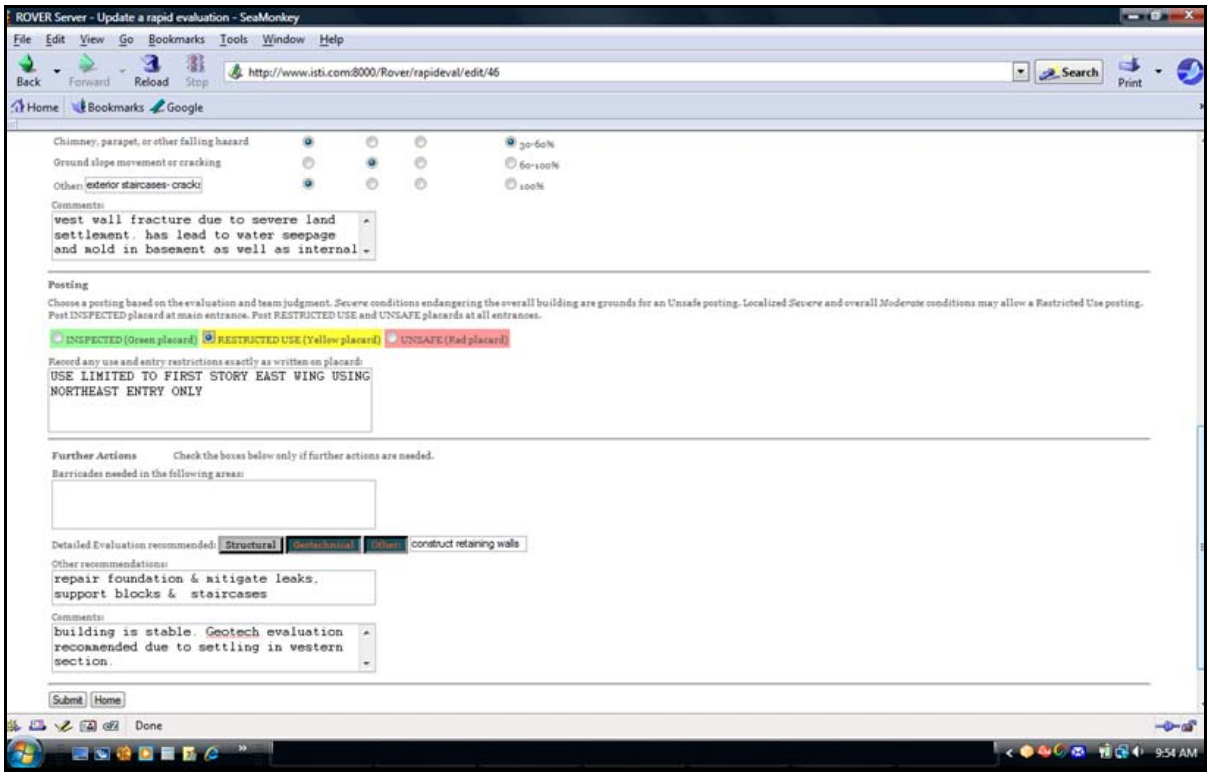
- Click on **Edit Rapid** for any site to view/edit the worksheet (*Skidmore College –Student Union* was chosen for this example). Edit the necessary information and click **Submit**. Clicking **Home** will not save changes and will return to the **site list**. Click **sites** to go back to **Site Listing**.

- In this example, note the following:

    - The **Restricted Use Placard** sign (yellow) had not been checked off during the rapid post-earthquake site inspection

    - Also, only the building exterior had been inspected as posted in the top right of the worksheet




ROVER Server - Update a rapid evaluation - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/rapideval/edit/46
Search Print
Home Bookmarks Google
Chimney, parapet, or other falling hazard
Ground slope movement or cracking
Other: exterior staircases- cracks
30-60%
60-100%
100%
Comments:
west wall fracture due to severe land settlement. has lead to water seepage and mold in basement as well as internal
Posting
Choose a posting based on the evaluation and team judgment. Severe conditions endangering the overall building are grounds for an Unsafe posting. Localized Severe and overall Moderate conditions may allow a Restricted Use posting. Post INSPECTED placard at main entrance. Post RESTRICTED USE and UNSAFE placards at all entrances.
INSPECTED (Green placard) RESTRICTED USE (Yellow placard) UNSAFE (Red placard)
Record any use and entry restrictions exactly as written on placard:
USE LIMITED TO FIRST STORY EAST WING USING NORTHEAST ENTRY ONLY
Further Actions Check the boxes below only if further actions are needed.
Barricades needed in the following areas:
Detailed Evaluation recommended: Structural Geotechnical Other construct retaining walls
Other recommendations:
repair foundation & mitigate leaks, support blocks & staircases
Comments:
building is stable. Geotech evaluation recoamended due to settling in western section.
Submit Home
Done
9:54 AM

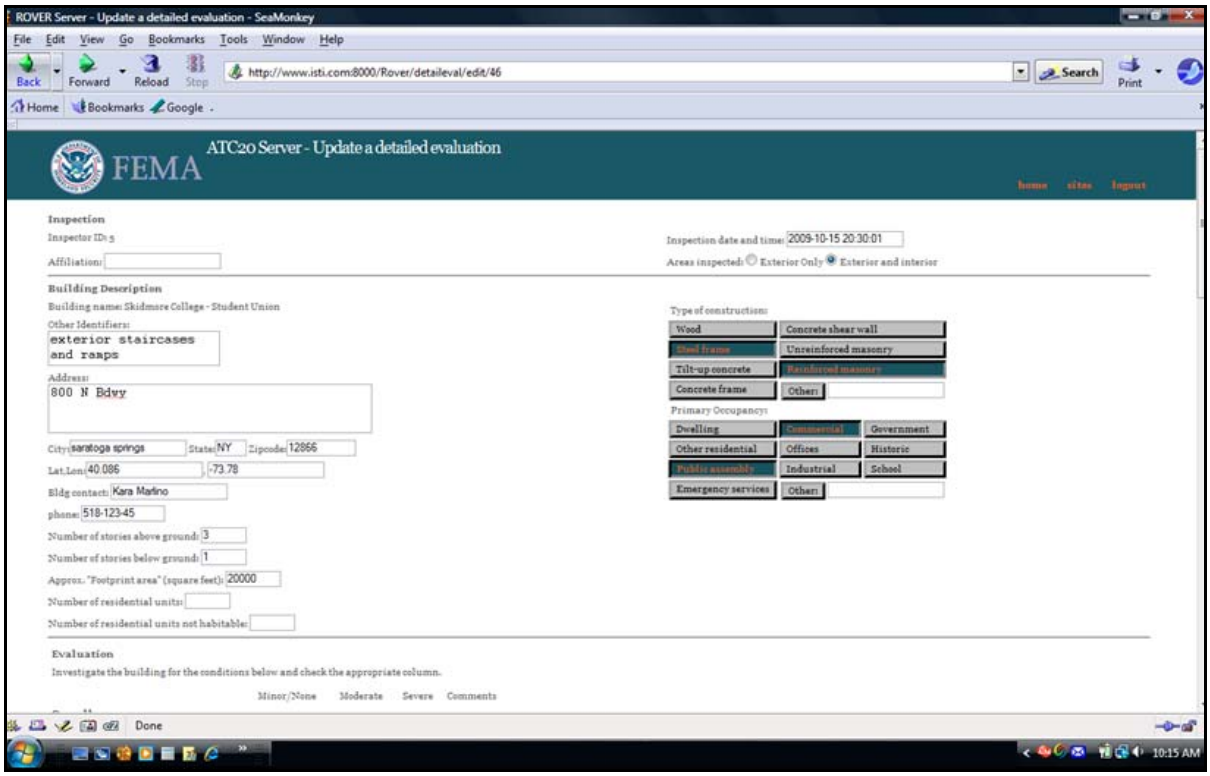
Edit Detailed Option:

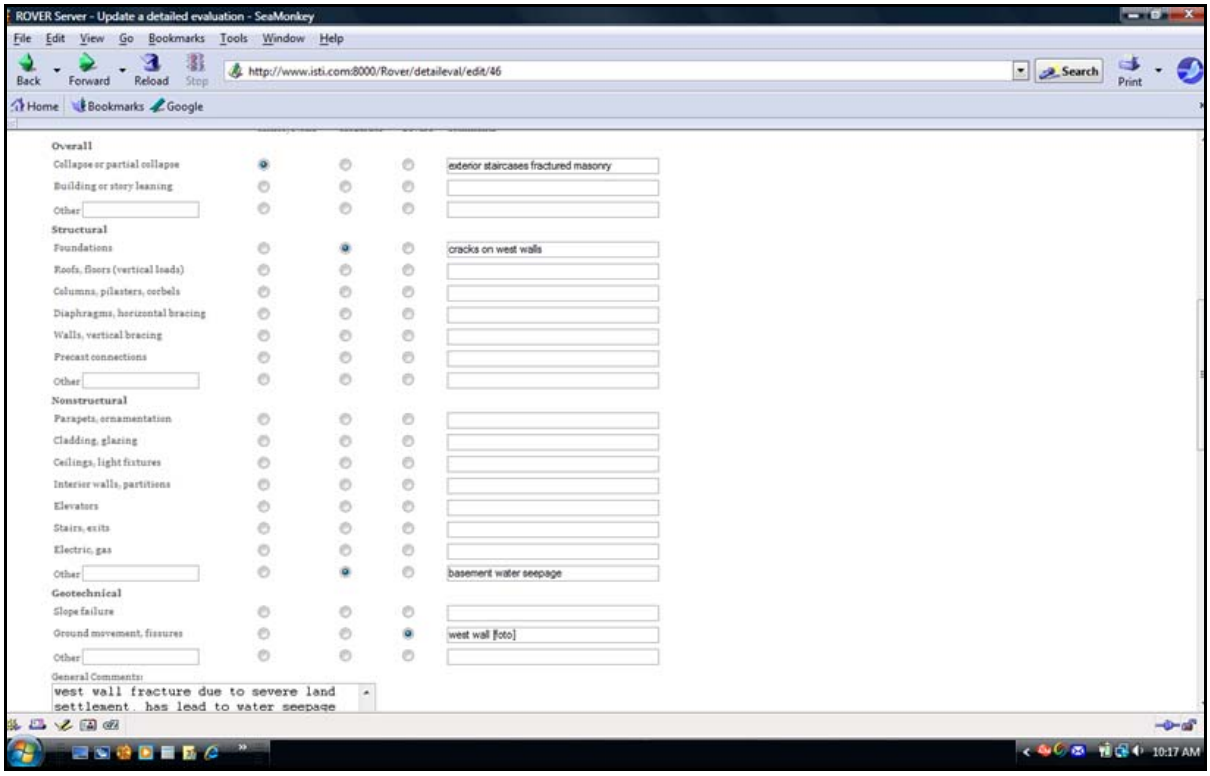
- Click on **Edit Detailed** for any site to view/edit the worksheet (*Skidmore College – Student Union* was chosen for this example). Edit the necessary information and click **Submit**. Clicking **Home** will not save changes and will return to the **site list**. Click **sites** to go back to **Site Listing**.

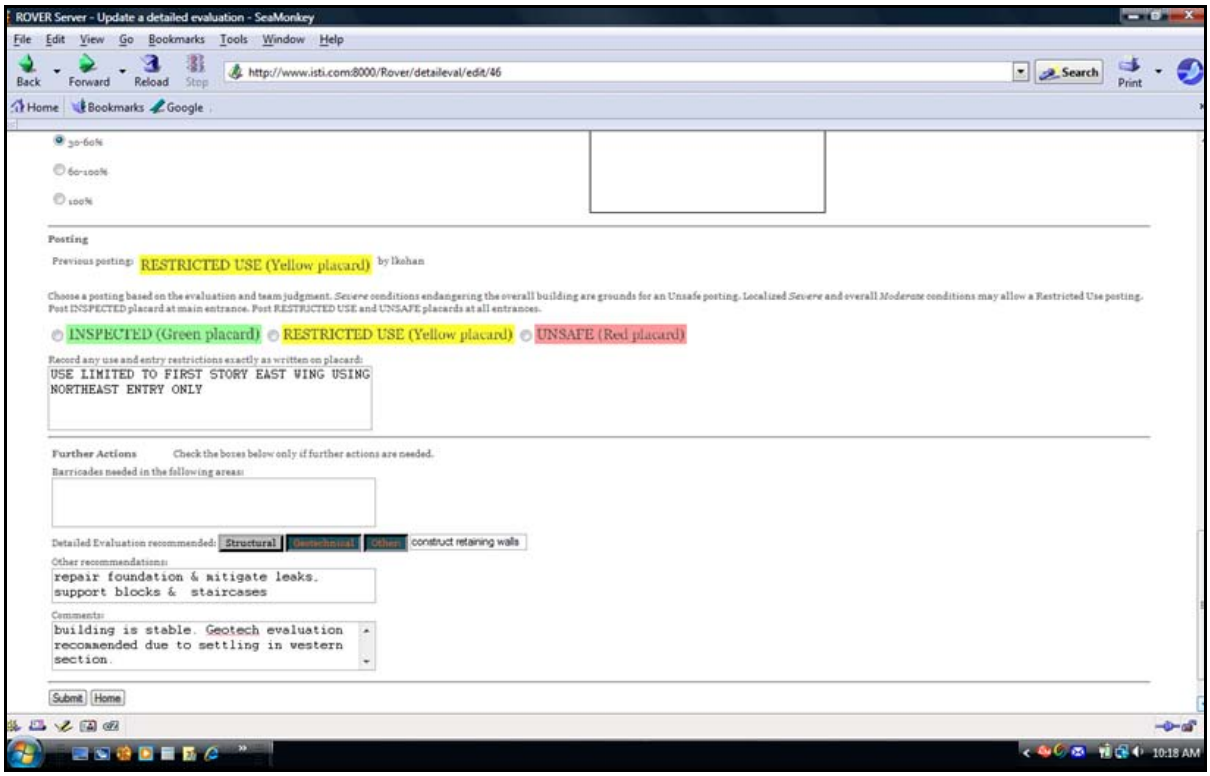
- In this example, note the following:

    - The **Restricted Use Placard** sign (yellow) had not been checked off during the detailed post-earthquake site inspection.

    - This is edited in the worksheet, and saved by clicking the **Submit** button. Also, both the building exterior and interior had been inspected as posted in the top right of the worksheet.

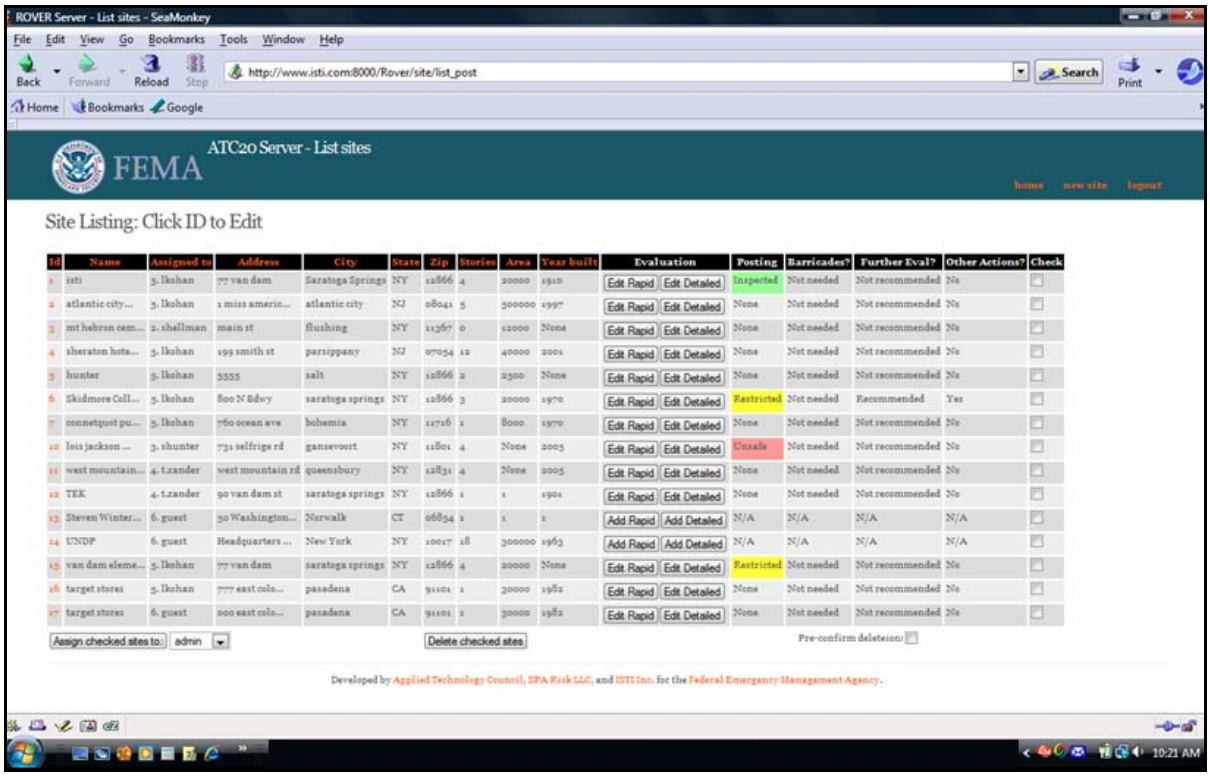

ROVER Server - Update a detailed evaluation - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/detaileval/edit/46
Search Print
Home Bookmarks Google
FEMA
ATC20 Server - Update a detailed evaluation
home sites logout
Inspection
Inspector ID: 5
Affiliation:
Inspection date and time: 2009-10-15 20:30:01
Areas inspected: Exterior Only Exterior and interior
Building Description
Building name: Skidmore College - Student Union
Other Identifiers:
exterior staircases and ramps
Address:
800 N Bdwy
City: saratoga springs State: NY Zipcode: 12866
Lat,Lon: 40.086 -73.78
Bldg contact: Kara Marlino
phone: 518-123-45
Number of stories above ground: 3
Number of stories below ground: 1
Approx. "Footprint area" (square feet): 20000
Number of residential units:
Number of residential units not habitable:
Type of construction:
Wood
Concrete shear wall
Steel frame
Unreinforced masonry
Tilt-up concrete
Reinforced masonry
Concrete frame
Other:
Primary Occupancy:
Dwelling
Commercial
Government
Other residential
Offices
Historic
Public assembly
Industrial
School
Emergency services
Other:
Evaluation
Investigate the building for the conditions below and check the appropriate column.
Minor/None Moderate Severe Comments
Done
10:15 AM


ROVER Server - Update a detailed evaluation - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/detaileval/edit/46
Search Print
Home Bookmarks Google
Overall
Collapse or partial collapse
exterior staircases fractured masonry
Building or story leaning
Other
Structural
Foundations
cracks on west walls
Roofs, floors (vertical loads)
Columns, pilasters, corbels
Diaphragms, horizontal bracing
Walls, vertical bracing
Precast connections
Other
Nonstructural
Parapets, ornamentation
Cladding, glazing
Ceilings, light fixtures
Interior walls, partitions
Elevators
Stairs, exits
Electric, gas
Other
basement water seepage
Geotechnical
Slope failure
Ground movement, fissures
west wall [foto]
Other
General Comments:
west wall fracture due to severe land settlement. has lead to water seepage
10:17 AM


ROVER Server - Update a detailed evaluation - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/detaileval/edit/46
Search Print
Home Bookmarks Google
30-60%
60-100%
100%
Posting
Previous posting: RESTRICTED USE (Yellow placard) by lkohan
Choose a posting based on the evaluation and team judgment. Severe conditions endangering the overall building are grounds for an Unsafe posting. Localized Severe and overall Moderate conditions may allow a Restricted Use posting. Post INSPECTED placard at main entrance. Post RESTRICTED USE and UNSAFE placards at all entrances.
INSPECTED (Green placard) RESTRICTED USE (Yellow placard) UNSAFE (Red placard)
Record any use and entry restrictions exactly as written on placard:
USE LIMITED TO FIRST STORY EAST WING USING NORTHEAST ENTRY ONLY
Further Actions Check the boxes below only if further actions are needed.
Barricades needed in the following areas:
Detailed Evaluation recommended: Structural Geotechnical Other construct retaining walls
Other recommendations:
repair foundation & mitigate leaks. support blocks & staircases
Comments:
building is stable. Geotech evaluation recomamended due to settling in western section.
Submit Home
10:18 AM

Click on **Sites** to return to the **Site Listing** menu. Note the yellow highlight **Posting** for this site.

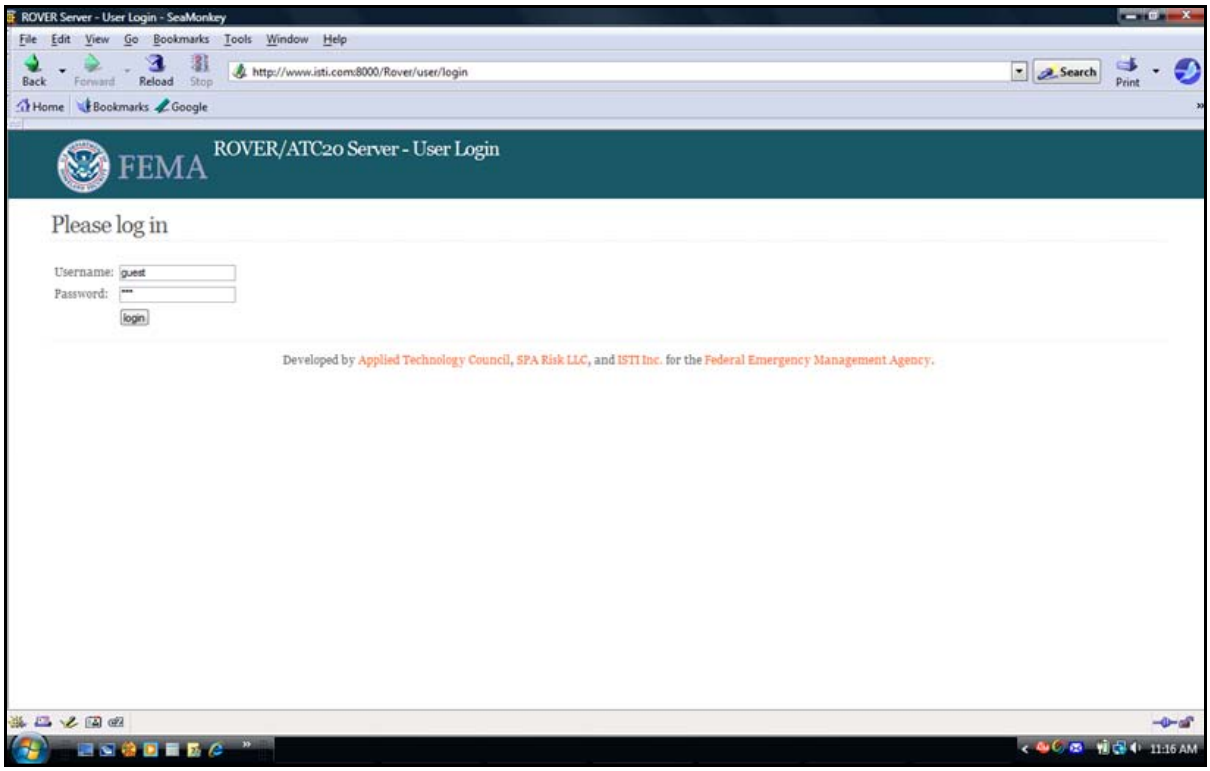
To print the ATC-20 worksheet, click on File → Print at the top left of the screen.

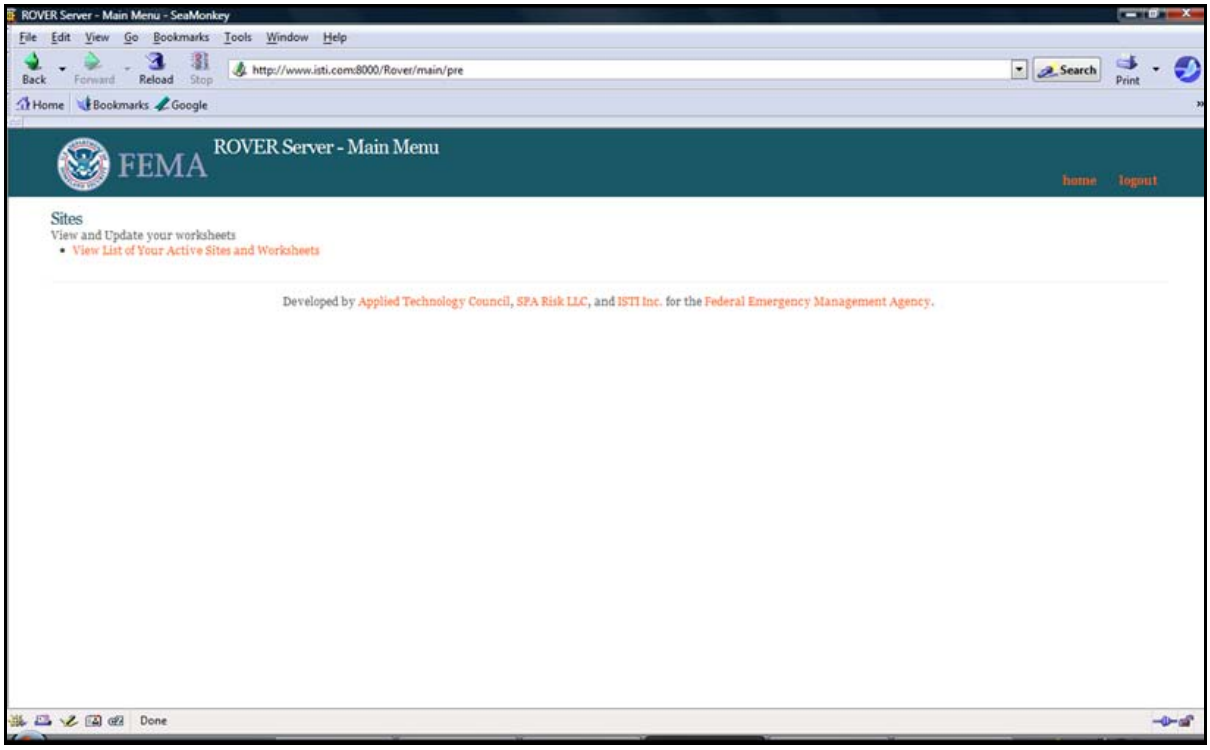

ROVER Server - List sites - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/site/list_post
Search
Print
Home Bookmarks Google
FEMA
ATC20 Server - List sites
home new site logout
Site Listing: Click ID to Edit
ID Name Assigned to Address City State Zip Stories Area Year built Evaluation Posting Barricades? Further Eval? Other Actions? Check
1 isti 5. lkohan 77 van dam Saratoga Springs NY 12866 4 20000 1910 Edit Rapid Edit Detailed Inspected Not needed Not recommended No
2 atlantic city... 5. lkohan 1 miss americ... atlantic city NJ 08041 5 300000 1997 Edit Rapid Edit Detailed None Not needed Not recommended No
3 mt hebron cem... 2. shellman main st flushing NY 11367 0 12000 None Edit Rapid Edit Detailed None Not needed Not recommended No
4 sheraton hote... 5. lkohan 199 smith st parsippany NJ 07054 12 40000 2001 Edit Rapid Edit Detailed None Not needed Not recommended No
5 hunter 5. lkohan 5555 salt NY 12866 2 2500 None Edit Rapid Edit Detailed None Not needed Not recommended No
6 Skidmore Coll... 5. lkohan 800 N Bdwy saratoga springs NY 12866 3 20000 1970 Edit Rapid Edit Detailed Restricted Not needed Recommended Yes
7 connetquot pu... 5. lkohan 760 ocean ave bohemia NY 11716 1 8000 1970 Edit Rapid Edit Detailed None Not needed Not recommended No
10 lois jackson ... 3. shunter 731 selfrigs rd gansevoort NY 12801 4 None 2005 Edit Rapid Edit Detailed Unsafe Not needed Not recommended No
11 west mountain... 4. t.zander west mountain rd queensbury NY 12831 4 None 2005 Edit Rapid Edit Detailed None Not needed Not recommended No
12 TEK 4. t.zander 90 van dam st saratoga springs NY 12866 1 1 1901 Edit Rapid Edit Detailed None Not needed Not recommended No
13 Steven Winter... 6. guest 50 Washington... Norwalk CT 06854 1 1 1 Add Rapid Add Detailed N/A N/A N/A N/A
14 UNDP 6. guest Headquarters ... New York NY 10017 18 300000 1963 Add Rapid Add Detailed N/A N/A N/A N/A
15 van dam eleme... 5. lkohan 77 van dam saratoga springs NY 12866 4 20000 None Edit Rapid Edit Detailed Restricted Not needed Not recommended No
16 target stores 5. lkohan 777 east colo... pasadena CA 91101 1 30000 1982 Edit Rapid Edit Detailed None Not needed Not recommended No
17 target stores 6. guest 000 east colo... pasadena CA 91101 1 30000 1982 Edit Rapid Edit Detailed None Not needed Not recommended No
Assign checked sites to: admin
Delete checked sites
Pre-confirm deletion:
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
10:21 AM

9.4 Using ROVER Server with a Named Screener Account

9.4.1 The FEMA 154 (Pre-Earthquake) Module

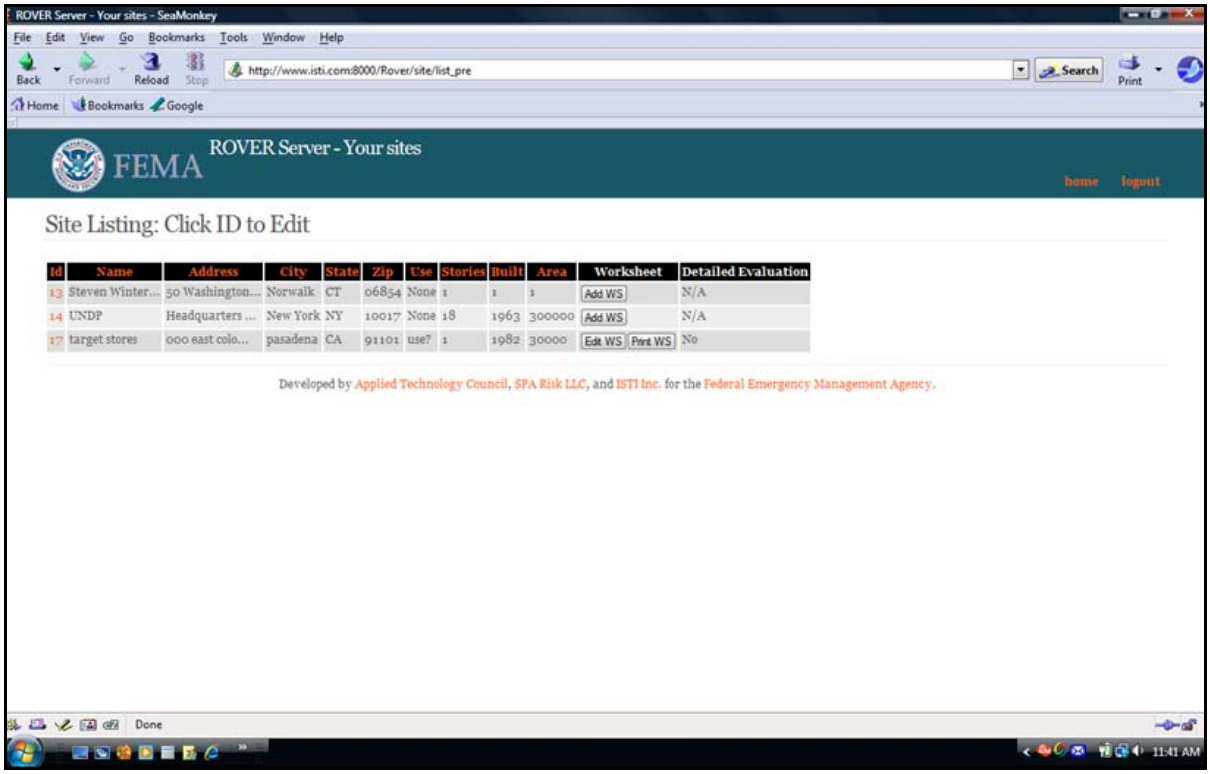
- In the ROVER/ATC-20 Server - System Selection screen, click on **FEMA 154 (Pre-Earthquake)**
- Enter Username and Password and click **Login**


ROVER Server - User Login - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/user/login
Search
Print
Home Bookmarks Google
FEMA
ROVER/ATC20 Server - User Login
Please log in
Username: guest
Password:
login
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
11:16 AM

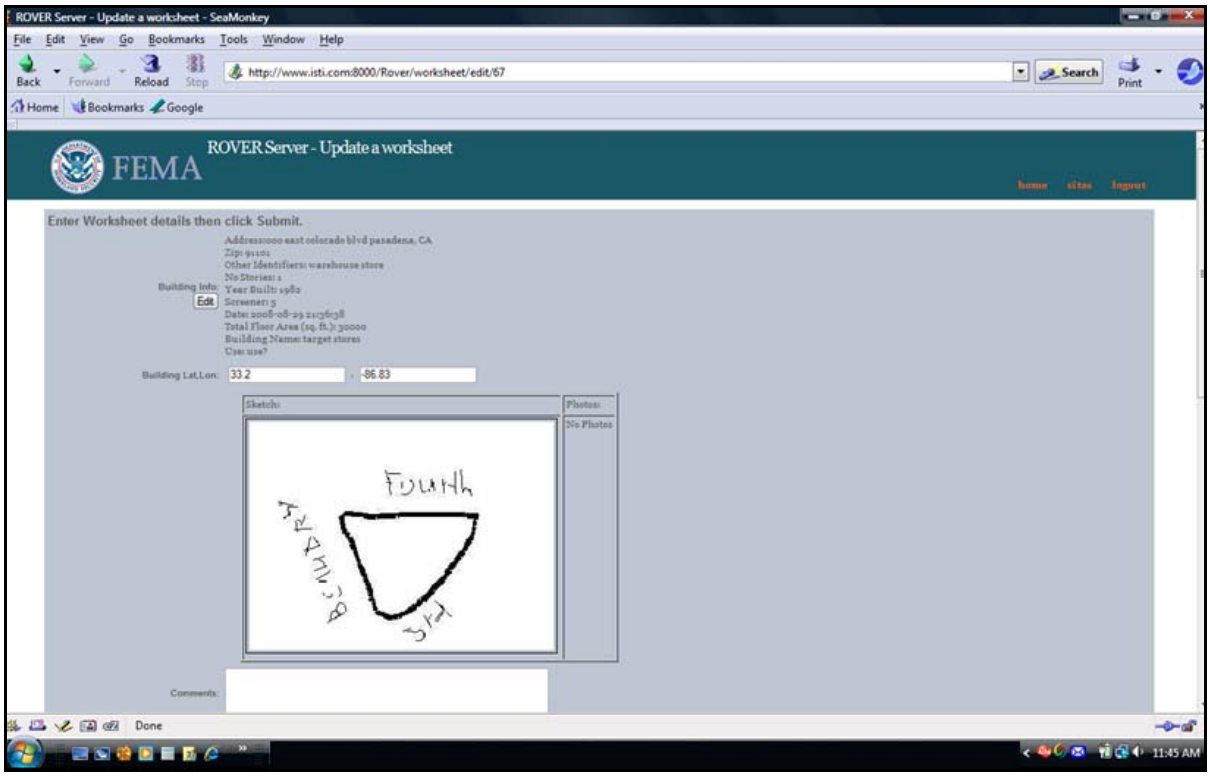

ROVER Server - Main Menu - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/main/pre
Search
Print
Home Bookmarks Google
FEMA
ROVER Server - Main Menu
home logout
Sites
View and Update your worksheets
View List of Your Active Sites and Worksheets
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
Done

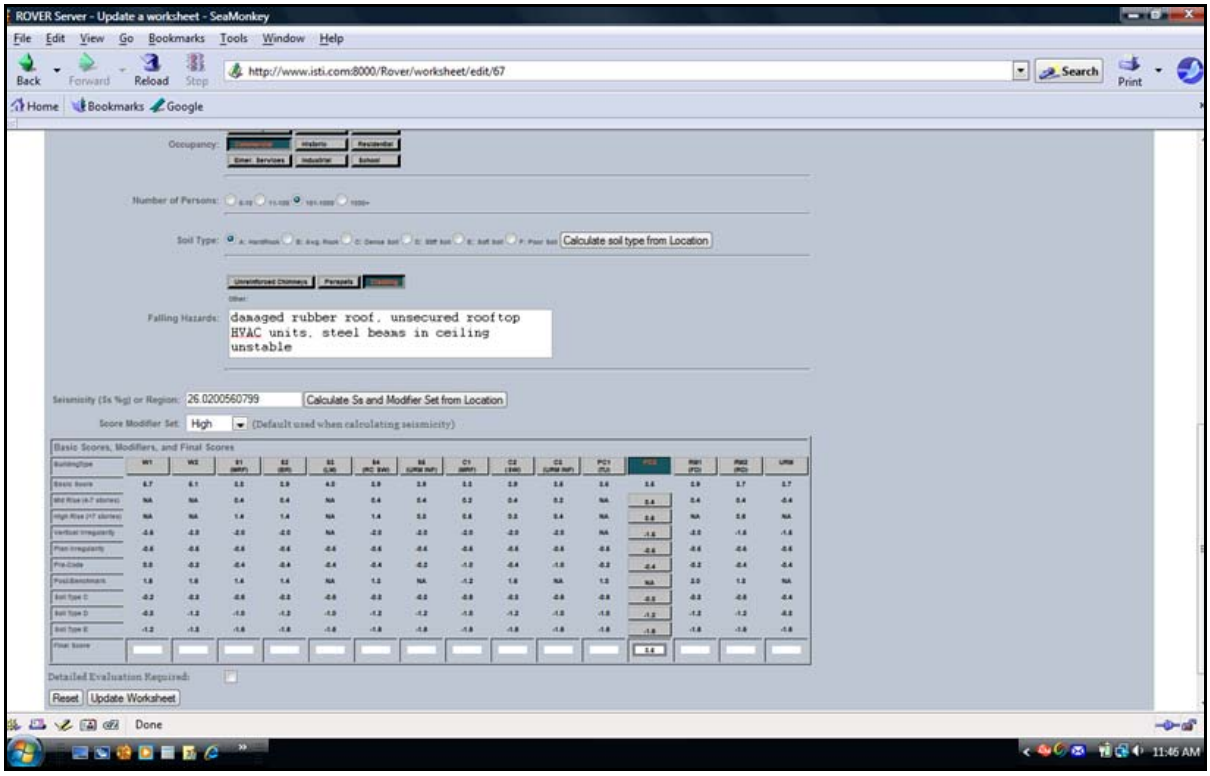
- Click on **View List of Your Active Sites and Worksheets.** This will display the Site Listing for the **Screener Name** "guest" only.

Note: The assignment of the site "UNDP" to "guest" by an administrator (demonstrated in **Section 9.3.1.2**) has been saved to and listed in this user's **Site List**. During the synchronization process, all new or modified assignments from the server will download to the appropriate clients (smartphones).


ROVER Server - Your sites - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/site/list_pre
Search
Print
Home Bookmarks Google
FEMA
ROVER Server - Your sites
home logout
Site Listing: Click ID to Edit
Id Name Address City State Zip Use Stories Built Area Worksheet Detailed Evaluation
13 Steven Winter... 50 Washington... Norwalk CT 06854 None 1 1 1 Add WS N/A
14 UNDP Headquarters ... New York NY 10017 None 18 1963 300000 Add WS N/A
17 target stores 000 east colo... pasadena CA 91101 use? 1 1982 30000 Edit WS Print WS No
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
Done
11:41 AM

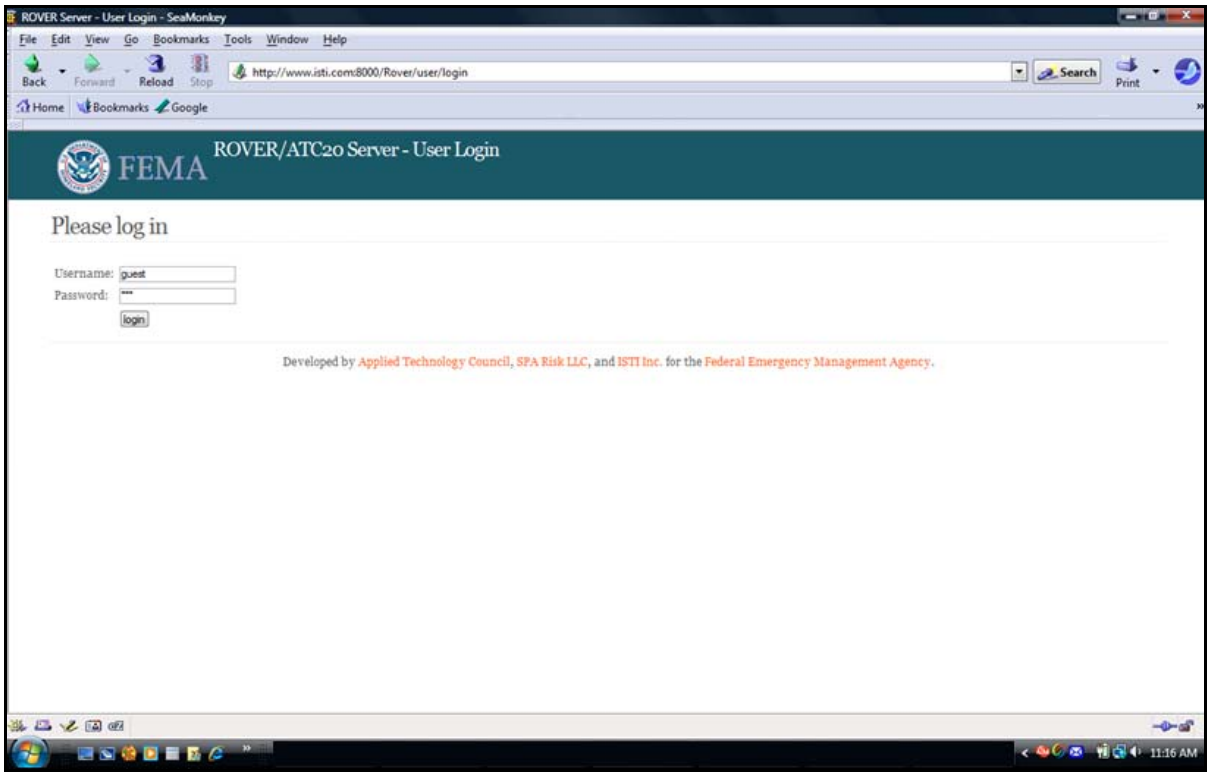
- To modify the site, click on **Edit WS** to view or **Print WS** to print the FEMA 154 worksheet. If no worksheet is available, the user can click on **Add WS** to create one.

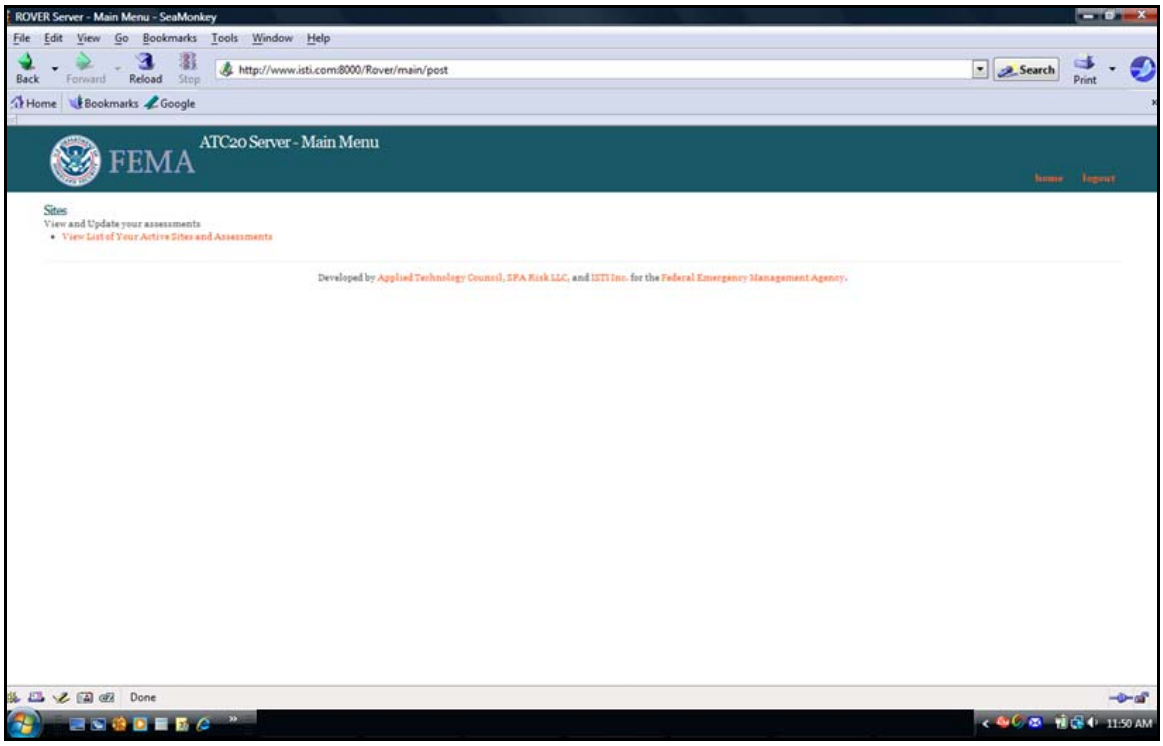

ROVER Server - Update a worksheet - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/worksheet/edit/67
Search
Print
Home Bookmarks Google
FEMA
ROVER Server - Update a worksheet
home sites logout
Enter Worksheet details then click Submit.
Address:1000 east colorado blvd pasadena, CA
Zip: 91101
Other Identifiers: warehouse store
No Stories: 1
Year Built: 1982
Screener: 3
Date: 2008-08-29 21:36:38
Total Floor Area (sq. ft.): 30000
Building Name: target stores
User use?
Building Info:
Edit
Building Lat,Lon:
33.2
-86.83
Sketch:
Photos:
No Photos
Fourth
Comments:
Done
11:45 AM


ROVER Server - Update a worksheet - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/worksheet/edit/67
Search
Print
Home Bookmarks Google
Occupancy:
Number of Persons:
Soil Type:
Calculate soil type from Location
Other:
Falling Hazards:
damaged rubber roof, unsecured rooftop
HVAC units, steel beams in ceiling
unstable
Seismicity (Ss %g) or Region:
26.0200560799
Calculate Ss and Modifier Set from Location
Score Modifier Set:
High
(Default used when calculating seismicity)
Basic Scores, Modifiers, and Final Scores
Detailed Evaluation Required:
Reset
Update Worksheet
Done
11:46 AM

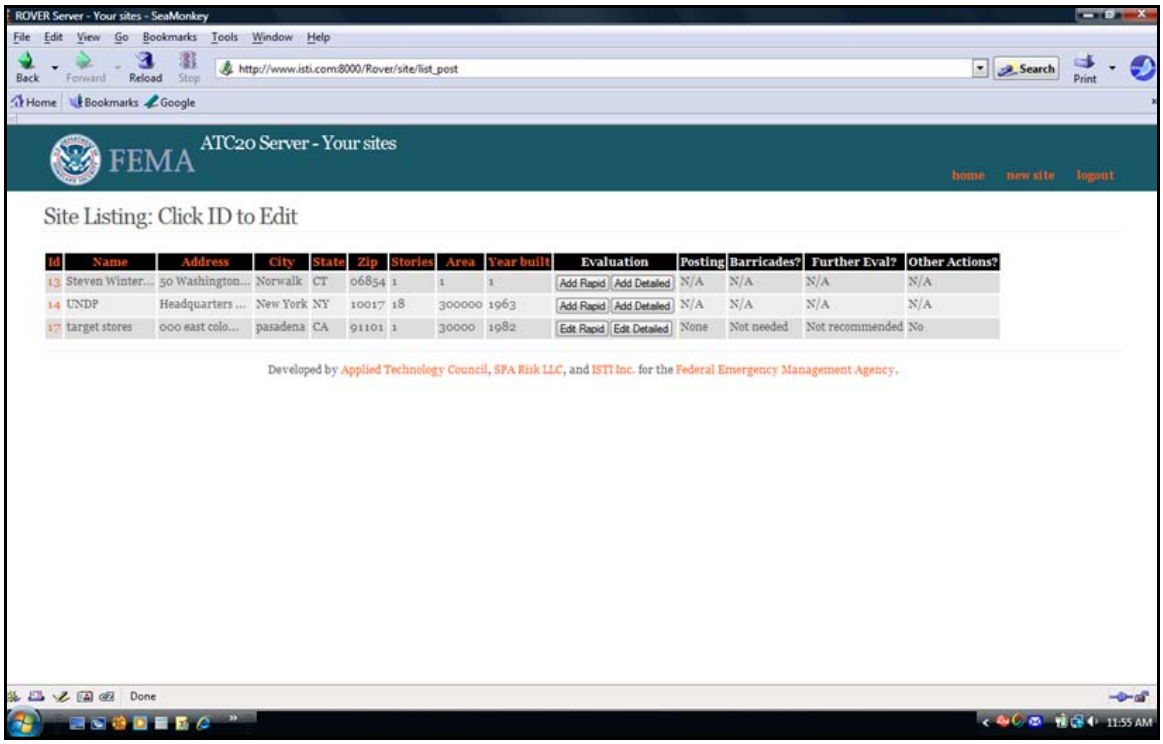
9.4.2 The ATC-20 (Post-Earthquake) Module

- In the ROVER/ATC-20 Server - System Selection screen, click on **ATC-20 (Post-Earthquake)**
- Enter Username and Password and click **Login**




ROVER Server - Main Menu - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/main/post
Search
Print
Home Bookmarks Google
FEMA
ATC20 Server - Main Menu
home logout
Sites
View and Update your assessments
View List of Your Active Sites and Assessments
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
Done
11:50 AM

The **Site Listing** menu appears displaying only the named screener's sites. This feature provides the same functionality as for an Administrator Account detailed in Section 9.3 Please refer to Section 9.3.1.2.2 for further details.


ROVER Server - Your sites - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.isti.com:8000/Rover/site/list_post
Search
Print
Home Bookmarks Google
FEMA
ATC20 Server - Your sites
home new site logout
Site Listing: Click ID to Edit
Id Name Address City State Zip Stories Area Year built Evaluation Posting Barricades? Further Eval? Other Actions?
13 Steven Winter... 50 Washington... Norwalk CT 06854 1 1 1 Add Rapid Add Detailed N/A N/A N/A N/A
14 UNDP Headquarters ... New York NY 10017 18 300000 1963 Add Rapid Add Detailed N/A N/A N/A N/A
17 target stores 000 east colo... pasadena CA 91101 1 30000 1982 Edit Rapid Edit Detailed None Not needed Not recommended No
Developed by Applied Technology Council, SPA Risk LLC, and ISTI Inc. for the Federal Emergency Management Agency.
Done
11:55 AM

10 References

(ATC) Applied Technology Council, 1989, 1991, 1996. *ATC-20: Procedures for Postearthquake Safety Evaluation of Buildings*, Redwood City, CA, 144 pp.

(ATC) Applied Technology Council, 2002a. *FEMA 154: Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook, Second Edition,* Federal Emergency Management Agency, Washington, DC.
http://www.fema.gov/plan/prevent/earthquake/professionals.shtm,
http://www.fema.gov/plan/prevent/earthquake/pdf/fema-154.pdf

(ATC) Applied Technology Council, 2002b. *FEMA 155: Rapid Visual Screening of Buildings for Potential Seismic Hazards: Supporting Documentation, Second Edition,* Federal Emergency Management Agency, Washington, DC

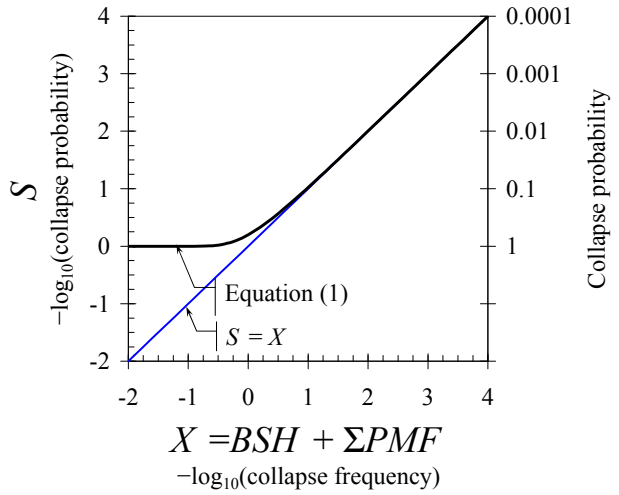
Wang, Y., and Goettel, K. A., 2007, SP 39: Enhanced Rapid Visual Screening (E-RVS) Method for Prioritization of Seismic Retrofits in Oregon, State of Oregon Department of Geology and Mineral Industries, Portland, Oregon

Appendix A. Some changes to the paper-based FEMA 154 scoring system

In a change relative to what is practical on a paper-and-clipboard system, ROVER performs a site-specific calculation of the FEMA 154 basic structural hazard (BSH) score based on the USGS's National Seismic Hazard Mapping Program (NSHMP). Since the latitude and longitude of the building is attached to the data, the server spatially interpolates S_S and S_1 (the short-period and 1-second 5%-damped spectral acceleration from the NSHMP). It calculates NEHRP site soil class at each site, based on a local copy of the USGS's national soil map, and applies the proper values of the International Building Code's site factors F_a and F_v. It then calculates the basic structural hazard value (BSH) based on the site-specific values of $S_S F_a$ and $S_1 F_v$, as opposed to the largest value in the county. Finally, ROVER implements an enhanced frequency-probability interpretation of S that, among other things, prevents it from being negative, which has been a conceptual problem for some users who recognize that a negative S would imply a failure probability in excess of 100%. Under the new interpretation, S is calculated as follows.

$$\begin{aligned} S &= \min_i \left(-\log_{10}\left(P_i\right)\right) \\ &= \min_i \left(-\log_{10}\left(1-\exp\left(-\lambda_i\right)\right)\right) \\ &= \min_i \left(-\log_{10}\left(1-\exp\left(-10^{-X_i}\right)\right)\right) \\ &= \min_i \left(-\log_{10}\left(1-\exp\left(-10^{-\left(BSH_i+\sum PMF_i\right)}\right)\right)\right) \end{aligned} \qquad (1)$$

where i denotes one of the possible building types selected by the user, BSH_i denotes the basic structural hazard score for building type i, ΣPMF_i denote the sum of the performance modification factors identified by the screener as present for building type i, X_i denotes the negative log frequency of failure during the planning period for building type i, λ_i denotes the mean failure frequency, and P_i denotes the failure probability during the planning period, assuming Poisson arrivals of failure events. S retains its previous definition as an estimate of the negative base-10 logarithm of the failure probability during the design life of the building, for the worst possible structure type identified by the user. Under Equation (1) S asymptotes to 0, as illustrated in the figure below.



Frequency-probability interpretation of S

Trouble Shooting Guide

Smartphone screen colors are different than those in the ROVER User Guide.

The background and screen theme colors of the sample **ROVER** screens that appear are determined by the user's defined **Settings** and can differ from one phone to the next.

I cannot switch between the Pre-, Post- and Detailed Post-Eq Surveys in Rover.

Each of the listed Surveys (Pre-EQ, Post-EQ, and Detailed Post-EQ) in the startup screen is a separate module sharing a common database. To perform a different type of survey, one must first **Exit** the application after completing data entry and **re-launch** ROVER to access the desired module.

How can I enter data?

- Use the stylus along with the virtual keyboard (click on the keyboard icon at the bottom of the screen);
- Use the smartphone's keyboard. This will usually rotate the working screen into a landscape mode for ease of view and entry.

I cannot start ROVER on tbe smartphone

With the smartphone turned on, tap on **Start** on the top left corner of the screen and when the popup menu appears, tap on ROVER. Please refer to section 6.1 for the different methods of launching ROVER on a smartphone.

I cannot get GPS device to work with ROVER.

There are usually two causes for this issue: The GPS is either not configured properly through the smartphone's Bluetooth setting or it is not properly partnered or paired with ROVER.

First, make sure that the GPS device is physically turned on and the smartphone can detect the GPS via Bluetooth by successfully following these steps:

1. The GPS has obtained a lock on its position as signified by the GPS indicator light. Please review the GPS manual for specific indicators. Locking the position may take a few moments or several minutes to take place;
2. Make sure that Bluetooth is turned On in the smartphone. See Section 7.4.1, p. 79-80;

3. The GPS device must be recognized by the smartphone; e.g., the smartphone must detect the GPS and list it as a Bluetooth device with a properly assigned serial or com port. See Section 7.4.1.1 for configuring a GPS device that is already detected by the smartphone. See Section 7.4.1.2 for configuring the GPS device as a new device and assigning it a com port;
4. Once the GPS has been recognized by the smartphone as a Bluetooth device, make sure that the phone and GPS are partnered or paired properly through ROVER. Launch Rover, go the desired module (Pre, Post, or Detailed Post- Inspection) and in the module's start up screen, tap on **Settings**. Follow the steps in Section 7.4.2 for partnering procedures.

If the following procedures do not result in successful operation of the GPS with the smartphone, there may be hardware failures to investigate with either or both devices.

How do I check to see if the GPS is working?

A utility called **Test Port** exists both on the smartphone and in Rover that tests the GPS connectivity**.** This procedure using one of the following options:

- In Rover's startup screen (Main Menu), tap on GPS
- From any of the survey modules, tap on Settings, then tap on GPS
- From the smartphone Start menu, tap on **Start**, then tap on **Bluetooth GPS Util** .

I am frequently losing the GPS signal. How can I maintain the GPS signal?

- Make sure the GPS battery is charged.
- Perform the **Test Port** procedure from ROVER's **Settings → GPS (Section 7.4.2)** to make sure that GPS is still locating its position.
- Relocate the GPS to an outdoor spot and re-attempt to lock the position.
- It is recommended that the GPS remain on throughout the duration of the building inspection. This will keep the timestamps between the two devices in sync or approximately close, and will facilitate re-connection should the GPS temporarily lose its connectivity.

How are latitude and longitude values displayed from the GPS device?

ROVER designates latitude and longitude values in decimal degrees, e.g., north latitudes and east longitudes are positive values (+) and south latitudes and west longitudes are negative values (-).

How do I reach the ROVER server from the smartphone to synchronize?

Synchronization can be performed in two ways:

- A wireless local area network (Wireless LAN or Wi-Fi) or the phone's data service can be used to communicate over the Internet;
- A physical connection using a cable (or cradle) between the smartphone and a local desktop can be used to communicate via ActiveSync.

In both cases, the client must be set up for either Wi-Fi or ActiveSync to be "on" before any synchronization of data can occur between the ROVER Server and Client. In general, the ROVER Server exists on a desktop that will have one or more internet addresses. The ROVER Client must reach the server via a single internet address. This is true whether using phone data service, Wi-Fi, USB or Bluetooth connection. Therefore, the Client must have the Server's IP address to initiate successful communication with the Server. Please refer to Section 8.1.

I have a Wi-Fi connection via a Wi-fi access point but cannot sync the smartphone to the server.

Connection to the internet will fail if your Wi-Fi access point is not connected to the internet, or if your laptop/desktop is not connected to the internet. In general, if you can access the internet from Internet Explorer on the smartphone, the phone connectivity is correctly configured.

How do I know if Wi-Fi is available and turned on?

Wi-Fi networks are 'self-discoverable', that is, no additional steps are needed for connectivity once the access point has been discovered. To use Wi-Fi, the smartphone must have access to the wireless access point of the service provider (public wireless points are known as "hotspots" and can range up to 100m in distance). Typically, the smartphone will have a WLAN switch that turns the feature on or off, very often a toggle switch on the side or back of the smartphone. After Wi-Fi has been turned on, the smartphone scans for available networks and displays a message in a pop-up window, allowing one to choose from a Wireless LAN (WLAN).

Can I use the USB cable (or cradle) with ActiveSync while the Wi-Fi is on to synchronize the smartphone and server?

No. You can only use one of the two options. The smartphone must NOT be connected to the desktop via ActiveSync Connection (USB cable or cradle). This will cause an error that will require restarting ROVER. Please see Section 8.2 for Connection to ROVER Server via Wi-Fi and Section 8.3 for Setting Up ActiveSync on Windows.

I cannot sync the smartphone to the server using Wi-Fi.

Assure that Wi-Fi is turned on. Often, this feature is turned On/Off with a physical button or toggle switch located on the side or back of the smartphone.

I can't find the server's IP address using Wi-Fi

To find the server's IP address,

1. Launch the **ROVER Server** on the desktop and obtain the Host IP as displayed in the **ROVER Server** start screen.
2. On the smartphone, make sure that Wi-Fi is on , and connectivity is achieved by tapping on **Settings → Connections → Wireless LAN** and properly configuring the network. Check connection by launching **Internet Explorer** and accessing the Internet.
3. On the smartphone, launch ROVER, tap on **Settings →Server**, and check that the **Server IP** and **Server Port** numbers match those from the ROVER Server screen on the desktop. If those numbers do not match, manually enter the Server numbers in the **Server IP** and **Server Port** boxes on the smartphone.
4. Tap on Test Connection to assure that the ROVER Server is found.
5. Once the server is found, tap **Save** to return to the main menu.

Please refer to Section 8.2 for details.

How can I differentiate between Pre- and Post-EQ Survey photos and sketches?

ROVER does not distinguish between pre- and post-earthquake photos. The user can specify the type of photo through comments.

Does deleting a site on the smartphone (client) delete it on the server?

Deleting a site on the smartphone will **NOT** delete the site on the server **IF** the site has been previously synced. Deleting sites on the server can be done with administrative privileges. Please refer to Section 9.3 for information on deleting sites on the server.

How can I type or view information entered in different tabs?

The up/down scroll arrows that allow data entry and viewing beyond the visible portion on the screen.

I get an error message,"Com port could not be created. Please check your settings and try again" when I designate a certain Com port for the GPS device.

The particular Com port you designated is already assigned to another Bluetooth device. Choose another Com port number.

I have some other trouble with ROVER.

Visit www.roverfound.com for possible solutions. The website contains a user community wiki for sharing information, a bug-reporting system, and a software archive (accessible once FEMA approves ROVER as free, open-source software).